COMPUTERWORLD

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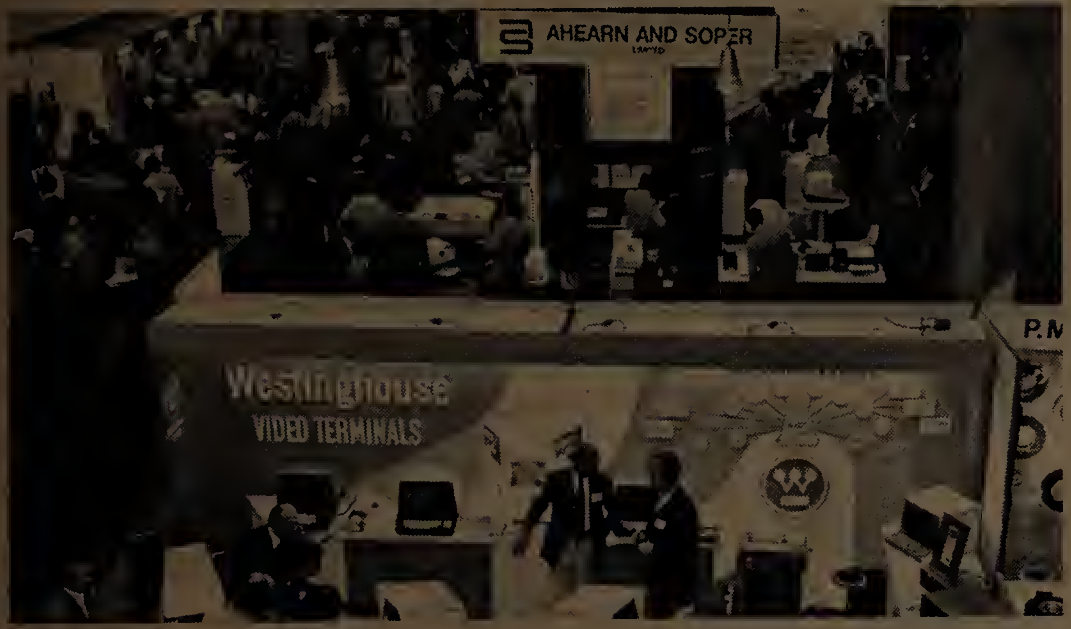

CW Photo by E. Surden

North of the Border

Visitors at the Canadian Computer Show and Conference in Montreal last week stopped in at more than 100 exhibits representing a cross-section of products and services. See story on Page 2.

Witnesses Hit Reform Act As Bell Grab for Monopoly

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – The Consumer Communications Reform Act of 1976 "is an unprecedented grab for monopoly power over a critically important industry," Kenneth Cox, senior vice-president of MCI Communications Corp., said here last week.

With this statement, Cox, a former commissioner of the Federal Communications Commission (FCC), set the tone for the second day of hearings on the proposed Reform Act conducted by the House Subcommittee on Communications.

Cox called the proposed law "misleadingly titled" and said it "asks Congress to make findings which are contrary to fact."

Although the telephone industry claims the Bell-fostered bill is not anticompetitive, the whole objective of the proposal would fail if it did not eliminate competition in both the terminal and specialized communications areas, he said.

"The most constructive thing your subcommittee could do would be to make a finding that this legislative proposal is without merit and should not receive further attention," Cox said.

"This is not a bona fide dispute over the allocation of authoritv in our federal system. Rather, it is just one more instance of dishonesty on the part of supporters of this legislation in their effort to override the FCC's decisions opening up telecommunications to limited competition so telephone companies can enjoy a total monopoly over this country's communications," he said.

Representing the specialized carriers, C. Gus Grant, president of Southern Pacific Communications and President of the Ad Hoc Committee for Competitive Telecommunications (ACCT), told the subcommittee AT&T's concerns about the present threat of competition from the specialized carriers "are absurd."

AT&T's chairman last week called for an immediate moratorium on competitive experiments of the FCC. For this and other views supporting the Consumer Communications Reform Act, see Page 6.

The carriers competing with Bell have captured "the gargantuan level of one-half of 1%" of the market. It is hard to see how this could be a threat to consumers, the independent telephone companies or the Bell system, Grant said.

Total revenues of the specialized carriers grew from $7 million in 1974 to $43 million in 1975, an increase of $36 million. During this same period, Bell's revenues grew from $940 million to over $1

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Calcomp vs. IBM Antitrust Trial Expected to Bring Quick Verdict

By Molly Upton
Of the CW Staff

LOS ANGELES – While any decision in the U.S. vs. IBM antitrust trial is seemingly years away, industry observers believe the California Computer Products, Inc. (Calcomp) vs. IBM antitrust trial will produce a more expeditious verdict.

The trial, scheduled to start here Nov. 8, is expected by presiding Judge Ray McNichols to last about six months.

Although this figure is somewhat longer than McNichols' original estimate of four months and thus pushes back the pending trial of Memorex vs. IBM, the Calcomp trial is almost certain to end sooner than the New York proceeding.

Calcomp is asking for a jury trial, whereas IBM's bout with the Justice Department is being heard by Judge David N. Edelstein without a jury.

Charges being pressed by Calcomp include antitrust violations in three market areas: general-purpose computer systems; disk files regardless of which maker's system they fit; and disk files on IBM equipment.

Calcomp Chairman Lester L. Kilpatrick said Calcomp intends to take one month to present a case similar to that of the Justice Department. The firm intends to use the best documents it can find, in-

(Continued on Page 2)

HIS Increases Speed Of Level 66 CPUs Without Hiking Costs

By Esther Surden
Of the CW Staff

WALTHAM, Mass. – Honeywell Information Systems, Inc. (HIS) has increased the performance of its Series 60/Level 66 batch-oriented mainframes with no corresponding increase in price, the firm announced last week.

Also announced were multiprocessor capabilities for the 66/05 through 66/80 systems; another version of the entry-level 66/05 introduced in June; a change in memory from 1K MOS random-access memory (RAM) chips to 4K RAM chips to allow the Level 66 systems to accommodate more memory; and a dual-spindle fixed disk.

The enhanced 60/66 system, available

(Continued on Page 3)

To Offset Effects of Embargos

Test of Oil Crisis Tactics Starts Today

By Edith Holmes
Of the CW Staff

PARIS – Nineteen industrial nations and more than 30 oil companies are beginning a computer simulation here today to test strategies that could counter an oil emergency of the future.

Coincidentally, today is also the third anniversary of the start of the Yom Kippur War which sparked a severe worldwide oil shortage in 1973-74.

As part of its energy games, the International Energy Agency (IEA) members will divert petroleum shipments to countries imagined to be short of oil on a Burroughs Corp. B6700, B4700 and an extensive telecommunications system at an Organization for Economic Cooperation and Development (OECD) installation here, according to an IEA spokesman.

The test will be conducted for six to eight weeks under the direction of the IEA. This agency was created by 19 oil-consuming countries following the 1973 war and the ensuing embargo on petroleum shipments to the U.S. and The Netherlands by most Arab states.

In addition to the U.S., IEA members include Canada, Britain, France, West Germany and Japan.

As of last week, the IEA anticipated 32 oil companies, responsible for moving 80% to 90% of the petroleum exchanged in international commerce, would participate in the simulation.

"Participation" by these companies is crucial, and with U.S. and IEA supervision, they have done most of the planning for this test, the IEA said.

Officials in Washington, D.C. and in other capitals agreed the major oil companies would have to carry the burden of managing supplies as they did in 1973-74 if another oil crisis occurs. Nearly half of the participating companies are American.

One new factor has been added to these games that didn't exist during the embargo three years ago: Congress has authorized the U.S. government to compel

(Continued on Page 6)

New Trial Ordered in Catamore

BOSTON – The U.S. Court of Appeals here has vacated a lower court decision ordering IBM to pay Catamore Enterprises, Inc. $11.4 million and ordered a new trial for the case.

The appeals court ruled the lower court erred by allowing the jury to find that both a written systems engineering services (SES) contract and two oral contracts were valid at the same time.

The SES contract had limited IBM's liability to one year and the case was filed after that time limitation had run its course.

"It seems to us that when a supplier and its customer, neither of whom is helpless in the marketplace, agrees on terms limiting the period of liability for future services to one year, those terms must be respected," the appeals court's opinion said.

"At the second trial, Catamore may attempt to escape the limitations in the SES agreement by establishing that it was induced to enter into it by fraud," the court added.

Calling the case a "paradigm of complex litigation rivaling the complexity of the cybernetics era from which it arises," the court also said its decision did not capture "the full flavor of Catamore's case in its assertions and evidence as to negligence, fraud and misrepresentation" on the part of IBM.

In reaction, Catamore said that "although we are disappointed at the vacation, we note that the court did not rule out fraud and in its opinion appeared to endorse negligence" on the part of IBM.

An IBM spokesman, however, said the appeals court ruling "confirms our belief that the original verdict was contrary to the evidence and the law."

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'Intelligent Silicon' Credited

Machines Cheaper Than People: Bowen

By Esther Surden
Of the CW Staff

MONTREAL – "A dramatic reversal has occurred in implementing hardware and software systems: machinery has become cheaper than people," Archibald Bowen, professor of systems engineering at Ottawa's Carleton University, told an audience at the Canadian Computer Show and Conference here last week.

Speaking on "Intelligent Silicon," Bowen noted increased production is resulting in a dramatic decrease in price, and silicon – the major component of semiconductor technology – has become the universal medium for implementing algorithms.

Two trends have become visible in hardware over the last decade, Bowen said. First, companies have tended to centralize the algorithm in the CPU, leading to massive CPUs.

With the advent of the microprocessor, however, even IBM is ready to admit "there may be something to the concept of distributed processing" – the second trend.

A dramatic reduction in the cost of silicon has resulted in the processor costing no more than its chips. Because of this, multiprocessors in cooperative nets are a reality, Bowen said.

Memory also has decreased in cost to the point that many people believe it could be given away without altering the price of the system. This is a bit exaggerated, he said, but charge-coupled devices and bubble memories are just over the horizon.

This type of memory technology will rival disk and tape and soon replace Mylar as a bulk storage medium, he predicted. Problems such as volatility still exist, but they are quickly being overcome, he added.

"It is now possible to conceive of hardware systems that are programmed to user needs. Silicon is cheap and people are expensive," Bowen said. The trend of the future will be toward customizing, even to the extent the user throws away half of the available power to use only that which suits his needs.

In software, the major trend is toward sharing because many techniques formerly implemented in software are now being implemented in hardware, Bowen said.

Since processing will be distributed between a set of nodes and start at the point where data is entered, new software must be developed to accommodate this. Software must be systems-oriented.

In the long run, computers will become like cars – supplied with a set of standard options – and the days of designing a computer and writing applications software will have passed, Bowen predicted.

IBM Announces Price Increases For Certain Products From GSD

ATLANTA – IBM last week announced increased prices effective Jan. 1 for selected General Systems Division (GSD) products.

The announcement included the following:

- A 5% increase in the Monthly Availability Charges (MAC).
- A 15% increase in the Minimum Monthly Maintenance Service Charges (MMMC).
- A 15% increase in Systems Engineering Services rates (SES) for all new contracts.

A 5% rise in Extended Term Plan (ETP) charges effective immediately was also announced. However, standing lease contracts will not be affected, IBM said.

Purchase prices and prices under the Term Availability Plan (TAP) for 36-month leases were not affected by the increases, IBM said.

The MAC price hike will affect all products in the GSD line except the Model 5230 data collection station, 5447 disk storage unit, eight models of the System 32 and two models of the IBM 3 introduced last month, a spokesman indicated.

The MMMC increases will not affect the 5100 portable system, older System 32s or the 3/4, 3/6, 3/8 or 3/15 systems, the spokesman noted.

The 3/10 and 3/12 as well as some of their associated features and attachments will not be affected, he stated.

The ETP increases hit the 3740 family of data entry equipment, the spokesman noted. For example, the 3742 programmable work station, which cost $176/mo under the old ETP, now costs $184/mo.

The purchase prices for these products were recently reduced 25% [CW, Sept. 20].

The 3741 data station, which previously cost $148/mo, will cost $155/mo and the 3747 will cost $433/mo compared with $413/mo previously.

The MAC price for the 3/10 Model A-6 will be $1,242/mo compared with the previous $1,185/mo price.

If the Model A-6 is tied into a configuration composed of a Model 5424 A-1 multifunction card unit, 5422 disk, 1403 N-1 printer, 5444 A-1 disk with 3271 control unit and a 3874 or 3277 display station, the entire system price will change from $3,143/mo to $3,221/mo, an increase of about 2%, the spokesman explained.

The MAC for the 3/15 Model C-21 processor with 164K of memory was $3,229 and will be $3,383.

The MMMC for the 3/10 will rise from $61.50/mo to $70.50/mo.

Fast Calcomp Verdict Expected

(Continued from Page 1)

cluding those turned up in previous suits against IBM such as those filed by Telex and Control Data Corp. as well as the concurrent Justice effort, he explained.

Although IBM initially presented three counterclaims, two have been deferred. The remaining counterclaim, which will be included in this case, involves IBM's charge that Calcomp stole trade secrets.

The deferred charges alleged that Calcomp violated IBM's patents and that it monopolized the plotter market.

Kilpatrick said his understanding of the procedures in the case are that Calcomp will present its case and IBM will conduct its defense. IBM will then present its countercharges, followed by Calcomp.

In the meantime, IBM's lead attorney has been working out of the Regency Hyatt Hotel here. Thomas D. Barr took deposition from George Canova, current Calcomp president, the week of Sept. 18.

Remarking IBM may be saving "the best until last," Kilpatrick said he is awaiting being deposed, presumably also by Barr.

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HP Adds 1000 Family With CPU Faster Than 21MX

By Esther Surden

Of the CW Staff

PALO ALTO, Calif. – Hewlett-Packard Co. (HP) last week introduced a family of small systems called the 1000 series which it said includes a processor 60% to 100% faster than its present 21MX-based systems.

Designed for computational, instrumentation and operations management users, the four 1000 systems are in the range of the Digital Equipment Corp. PDP-11/34 and PDP-11/45, Data General Corp. 3/D and 8/30 and Modular Computer Systems, Inc. Modcomp II-based systems, according to a spokesman.

The 1000s feature an optional increased microprogrammable control store space to allow users to completely reconfigure the systems if necessary, HP said. Image data base management software is available for the system.

Although current users of 21MX-based systems cannot upgrade to the 1000 family in the field, the processor is software-compatible with the 21MX processor, the spokesman noted. Most key peripherals can be transported from 21MX systems to the 1000 machines and HP expects to continue supporting the 21MX-based users, he added.

The 1000 processor features "dynamic micro cycle timing" which allows the CPU to "determine" the instruction cycle time necessary for the next execution and vary the cycle time according to need, he said.

Slower functions take 280 nsec while most operations are completed in 175 nsec, HP said.

The 8.5K of control store space allows users either to design microprogrammed subroutines for the system or use HP-supplied software. The software lets users develop microcode in the background and also provides a histogram of the functions the CPU is spending the most time performing.

The software package costs $1,000. Writable control store costs $2,000 for 1K.

The system console is the Model 2645 CRT terminal introduced last month [CW, Aug. 30]. It includes two built-in cartridge drives so programmers can plug in, modify and remove programs stored on the cartridges, the spokesman stated.

Image/1000 data base management software requires a minimum of 32K words and is a multiterminal, multiprogram enhancement of Image/DOS, HP said. It allows data to be accessed sequentially, directly or randomly by keyword value.

Optional distributed system software which allows a central 1000 disk-based system and other HP systems to share peripherals and data base files is available.

The Model 30 with 64K bytes of semiconductor main memory, 15M bytes of disk, the Model 2645 CRT display console, desk and RTE-II real-time executive costs $37,500.

The Model 31 is a cabinet-oriented unit with a 5M-byte disk and costs $33,500.

The Model 80 desk-type system with 128K bytes of semiconductor main memory, CRT console, 15M bytes of disk, 200 line/min printer and 1,600 bit/in. tape drive costs $62,600.

The Model 81 in upright cabinets costs $63,600.

Image 1000 for models 80 and 81 ordered before Jan. 1 will be free, the spokesman said. The normal price of the Image software is $6,000.

HIS Ups Throughput Of Level 66 Systems

(Continued from Page 1)

January 1977, are the result of "proprietary engineering changes within the central processors," HIS said. The 66/10 now runs 62.5% faster than its predecessor; the 66/20, 65.4% faster; the 66/40, 58.1% faster; and the 66/60, 35.7% faster, according to an HIS spokesman. He would not comment on what engineering changes were made to the CPUs.

HIS is working on a way for current Level 66 CPU users to upgrade to these new performance levels, but the capability is not available at present.

Dual or tandem system capability has also been added to the Level 66 systems.

Previously, the 66/40, 66/60 and 66/80 could run dual processors; the 66/20, 66/40, 66/60 and 66/80 could run tandem processors; and the time-sharing models 66/7 and 66/17 could not run either dual operations or in tandem, the spokesman noted. Now dual and/or tandem systems are offered throughout the Level 66 line, he said.

An additional central processor for the Model 66/05 can be purchased for $223,230 or $5,315/mo on a five-year lease; a second processor for the Model 66/10 costs $261,408 or $6.224/mo."

The version of the Model 66/05 introduced last week differs from the previously announced system in that it incorporates a 24K-word memory front-end network processor that accepts up to eight communications lines, HIS said.

The previous model featured a nonintegrated Datanet communications processor; for heavy communications needs, users of the latest version can add another Datanet processor, the spokesman said.

The CPU with the integrated processor costs $322,684 or $6,917/mo on a five-year lease. The system will be available in the third quarter of 1977.

The memory and mass storage enhancements were designed to allow system expansion for those users wanting more memory or mass storage without an increase in processing power, the spokesman explained.

The change from 1K RAM to 4K RAM chips allows the Models 66/10 to 66/40 to accommodate up to 1M words; the 66/05 can be expanded to 512K words, HIS said.

HIS hopes to allow its users to upgrade to the expanded memory in the field, but is unable to announce the capability at this time, the firm said. A 64K memory module that would increase the 66/05 to 256K words costs $66,360 or $1,580/mo.

Also introduced with the enhancements was a high-density fixed disk. The MSU0500 dual-spindle storage device has a capacity of 940M formatted characters, HIS said.

The disk features simultaneous access to any two drives through use of a dual port and a 1.597M char./sec transfer rate.

The mass storage unit, which will be available in late 1977, costs $47,500 or $1,089/mo on lease.

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WANG

Reform Act Attacked at Hearings As 'Grab for Monopoly Power'

(Continued from Page 1)

billion for private-line services alone, Grant said.

"AT&T, then, is growing annually by an amount larger than our total piece of the action," he pointed out.

'Would Destroy Industry'

Also speaking for the specialized carriers was Herbert Jasper, executive vice-president of ACCT, who said "the Bell bill would destroy our industry."

The ad hoc committee was formed to expose the "reckless charges and false claims" made by Bell and its telephone industry allies in opposing competition and promoting legislation to establish a statutory monopoly, Jasper told the subcommittee.

"Bell suffers from the Charlie Wilson syndrome. It believes what's good for Bell is good for the country." Pursuing this belief, AT&T has constructed a virtually "no lose" situation for itself, he said.

"After exploiting every possibility for delay and procedural advantage in both the regulatory and judicial appeal processes, Bell is now using its economic and political muscle to enlist the Congress in its anticompetitive strategy," Jasper said.

"AT&T wants you to believe there is a crisis in telecommunications," William McGowan, chairman of MCI Communications Corp., told the subcommittee.

Bell has insisted "the battle against competition be fought not in the marketplace, fully and fairly, but rather on the regulatory, legal, lobbying and propaganda fronts," he added.

As long as Bell can keep its legislation before Congress, it can claim its proposals are "under serious consideration, and this in turn can do great damage by confusing and intimidating prospective investors, potential competitors, customers, equipment suppliers, employees and even regulators," McGowan said.

Representing the Independent Data Communications Manufacturers Association (IDCMA), Arthur Carr, president of Codex Corp., said the members of his organization have provided users with equipment that reduced costs and increased efficiency.

"IDCMA member companies have been able to introduce breakthroughs in technology years ahead of the telephone company," Carr said, adding "much of that equipment is still not available from" the phone companies.

Each of the data communications companies has met "the key test" by providing services not offered by existing carriers. As a result of this innovation, computer communications equipment prices declined even while the cost of carrier services was increasing, he said.

Various independent studies have shown the interconnection of customer-provided equipment to the telephone network poses no more threat to the technical integrity of the network than carrier-provided equipment, he added.

In this regard, telephone company trouble reports show carrier-provided computer communications equipment "is more frequently the reported source of trouble than customer-provided equipment," he said.

Carr urged the subcommittee to look into AT&T's practice of bundling charges under which the cost for data communications equipment is lumped together with the price of transmission service.

With these types of charges, the user cannot effectively compare the cost of AT&T service with the cost of owning his own equipment, he said.

The proposed Reform Act would give the telephone company control over data communications terminal equipment and would eliminate competition in this area, according to Peter McCloskey, president of the Computer and Business Equipment Manufacturers Association (Cbema).

If the Reform Act was passed, Congress would be helping to kill the terminal equipment competition "on the mistaken theory that this will protect the residential user of telephone service," he told the subcommittee.

Citing a recent study by the National Association of Regulatory Utility Commissioners (Naruc), McCloskey said it had been shown that competition for terminal equipment would cause no harm to the telephone companies.

The Naruc study found data communications terminal equipment "clearly does not fall within the traditional concept of telephone service."

The public interest would not be adversely affected if the computer industry were to provide substantially all of this type of terminal equipment to users, the report concluded, according to McCloskey.

The carriers supporting the Bell-sponsored legislation are not satisfied with a large percentage of the projected terminal equipment growth. They want more, even if it means crippling existing competition, he said. "You shouldn't let this happen," he told the subcommittee.

Also addressing the legislators was Rep. John M. Murphy (D-N.Y.), chairman of the House Subcommittee on Consumer Protection and Finance, who said Bell is not really worried about MCI and the other small entrants seeking to provide specialized services.

The Bell System "is really worried that somewhere down the road a company like IBM, with billions of dollars at its disposal, will take advantage of the blurred interface between data processing and data communications to provide services the Bell System thinks belong to it," Murphy said.

Correction

Users will spend $1.4 billion, not $1.4 million, on DP supplies in 1976, according to the results of a Datapro Research Corp. survey reported in the Special Report on Security and Supplies [CW, Sept. 27].

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Datran Users Prepared for Shore Before Ship Sank

By Molly Upton
Of the CW Staff

WASHINGTON, D.C. – When the Data Transmission Co. (Datran) closed down its network Sept. 15, the only users still on the system were using it as backup while they debugged their new communications arrangements, according to Bob Schumacher, formerly manager of financial planning and analysis for the now defunct company.

To his knowledge, no one was left without an alternative source when the plug finally was pulled, Schumacher said.

The estimated number of customers still using some of the firm's nationwide digital communications facilities on Sept. 15 was perhaps 10% of its original customer base, if that much, he said.

When Datran announced it was going out of business, it gave users seven days' notice. However, the Federal Communications Commission (FCC) intervened and ordered the carrier to maintain operations until Sept. 15, thus allowing users a more reasonable amount of time in which to find alternative suppliers [CW, Aug. 30].

No Complaints Received

The FCC has not received any complaints from users unable to procure alternative services by that date, a spokesman said.

"All the carriers were very cooperative in helping customers find alternative services," he observed. "Since we've heard nothing to the contrary, we assume all customers that sought other services were able to obtain them within the time frame," he said.

Datran's assets are now under the administration of a receiver, Stanley J. Samorajczyk, who is evaluating bids by parties interested in obtaining all or part of the network.

The FCC, in order to make the Datran network more marketable, plans to keep the radio licenses needed to operate the 22 microwave links as part of Datran's property, the spokesman noted.

The FCC move, effected by not processing the renewal applications, allows future purchasers of Datran facilities to obtain the licenses and then apply for their renewal, he said.

Normally the FCC does not let such facilities remain unused, he added.

The Southern Pacific Communications Co. (SP) made an agreement with the receiver to keep the Kansas City-St. Louis link operating at its own expense to serve SP customers until formal disposition of the system is made, according to Rex Hollis, SP vice-president of marketing.

Only SP Interested in Datran

ALEXANDRIA, Va. – As the Oct. 12 bankruptcy hearing date approaches, Southern Pacific Communications Co. (SP) is the only bidder so far for the remains of the Data Transmission Co. (Datran) network, according to receiver Stanley J. Samorajczyk.

SP has offered to buy the entire network for $1 million. If it cannot, it is willing to pay $300,000 for the Kansas City-St. Louis link, which it utilizes for its system, an SP spokesman said.

Samorajczyk is communicating with other potential bidders and said he hopes there will be other bids presented at the hearing.

Administratively, it makes no sense to sell the network as an entity, he said. If there are no acceptable offers for the entire system, however, the bankruptcy judge will consider selling pieces of the system, he added.

The hearing will be held here at 2 p.m. on Oct. 12 at the U.S. Bankruptcy Court, 206 N. Washington St.

Tenn. Finally Opts To Go With Amdahl

By Toni Wiseman
Of the CW Staff

NASHVILLE, Tenn. – Tennessee finally decided on the newest addition to its centralized DP facility – an Amdahl Corp. 470V/6.

The machine was installed Sept. 20 and the Information Systems Division was running diagnostics by Wednesday, according to Ronald L. Woodall, assistant director for the division.

Much of the controversy over the acquisition had centered around the notion of retaining the current IBM hierarchy of multiple machines or going to a single large computer [CW, Aug. 23].

The state DP center currently has an IBM 370/158, 370/155 and 360/50. "We're a central data processing facility for the entire state and that means we have a lot of teleprocessing work, so I'm reluctant to release the 158," Woodall said.

The center will, however, probably release a 370/155 while retaining the 370/158 for backup and as a test bed, he said. There are some applications that may run better on the IBM machine than on the Amdahl 470V/6, he added.

The 470 is an outright purchase and is subject to a performance test period of 30 consecutive days of uptime, he noted.

Woodall plans to put production work on the 470 immediately while at the same time benchmarking the machine to come up with a coefficient for the state's users billing algorithm.

Large MVS System

He noted the state is bringing up a large system for integrated traffic records which will run under Multiple Virtual Storage (MVS), an IBM system control program.

The question of running IMS/VS on an Amdahl had also been under fire during the request for proposal review since, at that time, there were no shops running MVS systems and only one running a Single Virtual Storage system, he said.

Woodall said that in the future the 370/158 would probably be used under MVS while the Amdahl 470V/6 will be an MVS machine.

"I don't anticipate any difficulties," Woodall said. "The installation went very smoothly and the Amdahl people are very professional."

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AT&T Head Calls at Hearings for Halt to FCC Rulings

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – Congress should put an immediate moratorium on the competitive experiments of the Federal Communications Commission (FCC) "until their long-term consequences have been fully explored," John D. deButts, AT&T board chairman, said here last week.

Speaking as a witness at hearings before the House Subcommittee on Communications on the proposed Consumer Communications Reform Act of 1975, deButts said the subcommittee should "direct the FCC not to proceed further with its policies until this committee has had a full opportunity to review these important issues."

Present FCC policies are "undermining the telephone companies' ability to keep service as widely affordable as it is now." As a result, the rates for services will have to rise to match the cost of providing those services, he warned.

While there may be temporary advantages for some large businesses in the "FCC's brand of selective competition," to most people, "including those on fixed incomes, it will represent an added burden of higher rates.

"This we believe is the exact opposite of what Congress intended the nation's telecommunications policy to be," deButts told the subcommittee.

In answer to questions from individual subcommittee members following his prepared testimony, deButts admitted that while the bill is called the Consumer Communications Reform Act, no consumer group has come out in favor of the proposed law.

He also estimated the Bell System has spent $600,000 for lobbying, but denied that any Bell employees are working full-time on the effort.

The proposed law was a joint effort and was put together by various companies and interests in the telephone industry, deButts claimed.

In a later question period, however, Frank Barnes, president of the U.S. Independent Telephone Association (Usita), told the subcommittee much of the work on the bill had been done at Usita headquarters here with representatives from independent phone companies working together with "authors" from AT&T.

Rep. Timothy Wirth (D-Colo.) attempted to establish with several witnesses that telephone companies had sent out information on the Reform Act with monthly customer bills. He cited one instance to deButts in which New Jersey Bell had sent out such material.

The AT&T chief admitted this had happened in New Jersey, but said the practice has been stopped within the Bell System.

Wirth asked Barnes whether the independent phone companies had sent out similar pro-Reform Act material. The Usita chief noted each member company is free to set its own policy but, he said, some probably had done so.

In answer to a related question, Barnes said costs for such literature were probably deducted as a business expense by the phone companies for tax purposes. Wirth then asked whether Barnes realized it was against the law to deduct lobbying expenses on corporate tax returns.

John F. Morgan of the Telecommunications International Union testified that "a major increase in safety hazards is due to improperly installed equipment purchased from the newer communications equipment vendors."

Morgan, however, was unable to cite specific cases where such safety hazards had been discovered.

Oil Embargo Tactics Begin Tests Today

(Continued from Page 1)

these companies to share domestic oil supplies with other countries.

During the test, a control group working here will pose and post hypothetical interruptions of the oil supply. These interruptions might consist of cuts in Arab oil production and bans on oil shipments to particular countries, for example.

Another control group of oil executives and international civil servants will assess the severity of the problem and relay data to the 32 oil companies via the computers and telecommunications system.

The system will be used by these companies, in turn, to advise Paris of possible shortages of specific petroleum products in particular markets. The oil companies will take into account the stocks they have on hand at sea and inform the IEA how much oil they can divert to short markets and how soon.

The simulation represents the first time the entire system has been tested. In the past, IEA has tested only whether the oil companies have standardized the way they keep and transmit their data in keeping with the agency's instructions, according to Richard Martin, deputy director of the Office of Fuels and Energy in the U.S. State Department.

While any remaining communications, data accuracy and compatibility problems are likely to be worked out in the next several weeks, the test will not prove the full readiness of the system, IEA said. Whether ships can be rerouted the way the oil companies say they can will remain untested.

In addition, without a real political crisis, there is no meaningful way to test the willingness of unaffected governments and companies to risk the possible repercussions of cooperating with countries that have been subjected to embargoes or reductions in shipments, the IEA stated.

How to divert oil to short markets without precipitating steeper prices is yet another problem the simulation will not test. While the governments have agreed prices will not be "discriminatory" or produce "excess profits," no one knows what practical limits will eventually define those terms, U.S. officials said.

Although the U.S. took the lead in the alliance between governments that resulted in establishing the IEA, it will not participate formally in the test.

In accordance with the Energy Policy and Conservation Act of 1975, however, the U.S. government will send observers here to oversee the actions of the participating oil companies to guard against breaches of antitrust law, Martin said.

The simulation will meet one major goal of the IEA: to show the oil-exporting nations the importing countries will assist each other in crisis situations.

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Congress Gets Bill Limiting All Access To Citizens' Financial, Telephone Files

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – Congress has received a bill prohibiting banks, credit-card companies and telephone companies from turning over individuals' records without their consent unless such action would jeopardize a criminal investigation.

The "Right to Private Records Act" (H.R. 15657) would restrict access by persons in the private sector as well as by state and local governments to records concerning an individual's financial transactions and telephone toll calls, according to Rep. Edward I. Koch (D-N.Y.) and Rep. Barry Goldwater Jr. (R-Calif.), who introduced the bill.

In excluding all private sector individuals as well as state and local governments from routine access to these personal records, this bill goes further than H.R. 214, introduced earlier this year. That bill applied only to the Federal government.

H.R. 214 was approved by the House Judiciary Subcommittee on Courts, Civil Liberties and the Administration of Justice and is now before the full Judiciary Committee, according to a Goldwater staff member.

In allowing dissemination of an individual's records, the new bill requires one of the following:

- The individual's written consent.
- An administrative subpoena which the individual could challenge.
- A judicial subpoena with notice to the individual except in cases where a criminal or civil investigation would be jeopardized.
- A court-authorized search warrant with notification to the individual.

The proposed law also would require the recordkeeper to maintain an accounting of all record disclosures.

Individuals whose records were unlawfully obtained could sue for actual and punitive damages; violators could be punished by imprisonment for not more than one year and/or a fine of not more than $1,000.

In addition, the legislation provides limits on supervisory monitoring of telephone conversations.

In a statement issued jointly, Koch and Goldwater said "state and local governments and persons and organizations in the private sector should not be permitted unrestricted access to citizens' credit, bank or utility records on whim or for insufficient reason when the Federal government will be prohibited from these odious practices [if H.R. 214 is passed].

"Citizens should be secure in their belief that no government agents (federal or local), representatives in the private sector or simply another private citizen can have access to the files of other citizens except under rigid restrictions and crime-regulated procedures."

It is "essential" to point out the new law does not get in the way of any legitimate request for information by the law enforcement community, the Goldwater staff member said.

In addition to protecting the individual, the proposed law would protect financial institutions by clarifying their responsibilities in response to subpoenas, the staff member said.

At the moment, there are about "100 different kinds of subpoenas that can be thrown at them and banks don't often know the difference between them," he explained.

The bill was prompted partially by a recent Supreme Court decision in Miller vs. California in which the court ruled bank records belong to the bank, not the individual, the aide said.

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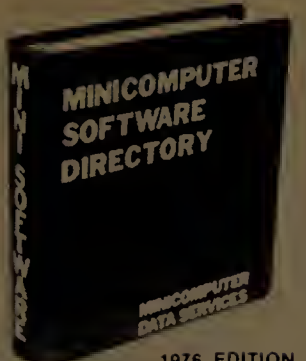

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Phone Lines Tie Sensors to CPU

DP-Based Security System Guarding Boston Schools

By Nancy French
Of the CW Staff

BOSTON – City officials have installed a well-publicized computer-based security system to reduce vandalism committed in public schools here – destruction that last year reached $4 million.

This year the security system guards 55 school buildings. Eventually 133 of the city's 200 schools will be protected, according to Deputy Mayor Robert J. Vey.

The system, a JC-80 from Johnson Controls, Inc. of Milwaukee, monitors entry and movement in the schools by means of sensors on doors and motion detectors in both interior and exterior locations.

The sensors, tied to the JC-80 by leased telephone lines, transmit seven-point binary code to the processor at the rate of 300 signal/min, according to Stephen Barvenik, a local Johnson sales representative.

The processor decodes the signals received and converts them to digital form for processing by the computer.

If a door is opened or an intruder inside a school activates a motion detector, a circuit is broken. The computer immediately activates alarms in the central security station and in the school building.

In the central station, a printout identifies the school and location of the sensor and instructs the operator on what action to take. In most cases, the operator would radio dispatch a security guard in a patrol car to the site.

The system can also detect tampering with the telephone lines by means of parity bits in the code, according to Barvenik.

Seven operators assisted by 12 unarmed security guards have been hired to cover the computer station and patrol the schools around the clock, according to city officials.

Should Deter Vandals

The system is aimed at deterring vandals before they can do any damage rather than apprehending criminals, Vey said. Most vandals are juveniles, Barvenik noted.

The JC-80 includes a Modular Computer Systems, Inc. processor with 32K of magnetic core memory. Core was chosen rather than integrated circuits because of possible exposure to high temperatures, Barvenik explained.

The processor, expandable to 64K, is equipped with a 512K-byte Digital Design magnetic disk, two keyboard send/receive teletypewriters, one Tally Corp. line printer and one Johnson CRT.

Boston officials do not expect to eliminate vandalism simply by installing a computer system. However, the JC-80 will enable this city to defend itself against destruction of school property better than most other major cities, officials said.

The contract with Johnson was estimated at $300,000. Computer operators, security guards and telephone lines will make annual operating costs significant, they added.

But the system is said to be doing the work of 133 men and officials hope it will pay for itself within two years by measurable decreases in destruction of school property.

Although it is too early to tell, a survey of school custodians indicated a drop in the number of break-ins, officials said.

A rabbit that got loose in one of the schools set off one of the motion detectors and activated the entire warning system, Barvenik added.

In addition to security, the system will be used for monitoring and controlling heat, ventilation and air conditioning systems, a city official said.

Dartmouth to Develop Retrieval System To Locate Art Work

HANOVER, N.H. – Dartmouth College will design and develop a computer-based system for retrieving visual information such as works of art, photographs of minerals, star maps and anatomical illustrations under an $87,500 grant from the Exxon Education Foundation.

The project involves developing a control unit to link an off-the-shelf microfiche projector from Image Systems of Culver City, Calif., and an ordinary computer terminal on the Dartmouth Time Sharing System, according to Prof. Arthur W. Luehrmann, assistant director of the Office of Academic Computing and assistant director of the Office of Instructional Services and Educational Research.

The computer will be used to store a data base of information describing each image recorded on microfiche, including its address in the fiche storage unit.

The user will be able to key in the work he wishes to see via the terminal; the computer will feed a stream of data to the control unit linking the terminal and the microfiche projector, according to Luehrmann.

The data will include the address of the fiche by row and column, and the projector will locate the work and display it for the user in a matter of seconds.

The fiche is made from 35mm color slides using "old-fashioned" photographic processes although the system could be adapted to computer output microfilm (COM), Luehrmann said. In a text application, for example, COM could be made into fiche and stored in the projection unit.

"Then our system could be used to retrieve the pictures," he explained. "You could also update it fairly quickly because the COM can be written by computer and developed in 20 minutes."

In addition to student use in art history courses, Luehrmann envisions the system's use in medical education – "There are some things in medicine you just have to see to understand."

The National Library of Medicine circulates large collections of information on fiche, and right now retrieval of that information is fairly complex, he said.

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Industry Forced Into Electronics Age

Supermarts' DP Seen Reaction to Modus Operandi Gap

By Toni Wiseman
Of the CW Staff

DENVER – The food industry's use of computers, electronic point-of-sale (POS) and scanning is basically a reaction to a void in its normal modus operandi, attendees of the Super Market Institute's annual DP conference were told here recently.

Since mechanical registers are simply no longer available, supermarkets have been forced to move into the electronics age, being pushed rather than going of their own volition, according to Dale Argotsinger, director and manager of training for King Soopers, Inc.

"Speaking from the grocery end of the industry, we have people who are having to learn new terms and volumes of data. This is a big step for users, particularly when you consider that many of our managers today started as courtesy clerks and checkers before moving into management," Argotsinger said.

Faced with the necessity of deciding on a POS system, King Soopers found there were about 12 vendors from which to choose. The first questions the company had to ask itself were which vendors would be around for a while and whether those vendors would be able to provide service on an ongoing basis.

Other questions included: What kind of information does the system provide? Can it automate scheduling? What information will it give customers that will benefit them when they look at their bill? Can the system be upgraded or is it stalemated?

Eight Systems Planned

King Soopers settled on the NCR 255 system and by the end of last week had eight systems installed, each consisting of registers with an in-store, minicomputer operating as the controller, he said.

The minis function in the regular store environment and need no extra air conditioning, Argotsinger noted.

In addition, each store installation includes a backup power system which can operate four terminals for 90 minutes if power is lost.

If communications between the controller and registers are lost, the NCR registers can function off-line, he said. However, this is not an optimal situation because data would have to be collected from the terminals and later allocated on a percentage basis to various departments, he added.

King Soopers found that as it moved toward the initial installation in May 1975, it had to work with the vendor to establish the kind of keyboard with which it would feel comfortable and which would give it the data it felt was important.

"This goes back to the fact that our industry is reacting to the system rather than innovating it," Argotsinger said.

The number of problems which can be encountered in changing from mechanical to electronic registers is vast, to say the least, Argotsinger indicated.

"There are vast numbers of people who are familiar with computers and the computer world, but there are also a number of checkers and management people who are afraid of that world and were consequently not accepting the new system," Argotsinger said.

"We needed to give them the understanding that the system was a simple one," he noted.

King Soopers determined the changeover from a mechanical to an electronic environment would require a minimum of 16 hours of training on the registers for both checkers and managers, he said.

This included two hours to learn what information could be entered and extracted from the system as well as the new terminology associated with it.

Six hours of training in the touch system of operation were scheduled to develop checker productivity in a training mode. Another four hours were allotted for working with groceries.

Finally, the checkers spent four hours in a training store working at a checkout stand with customers while being observed by a trainer, Argotsinger said.

Checkers were assigned to an already-converted store for an additional eight hours in a work environment with customers before their store went on-line, he noted, adding this was a problem before the first store changed over.

"We ask management people to go through the same training process and then go into a management training program," Argotsinger said. "They will spend 32 hours working in a store which already has the system in, working primarily in closing down, getting printouts and doing accounting and programming.

"Then, when their store opens, we provide them with skilled people who have been with the system for three to four months to help management during the opening week," he explained.

King Soopers has had very little trouble with the system mechanically, he noted. The main problems were encountered when the first store opened and checkers had insufficient experience working with both the new registers and customers.

There was also a consumer problem since the store had not distributed handout sheets explaining the system in advance, so customers asked checkers interminable questions which stopped the flow, he said.

Police Chiefs Set Meeting On DP in Law Enforcement

WASHINGTON, D.C. – The International Association of Chiefs of Police (IACP) is calling for papers to be presented at a two-day symposium on law enforcement DP management scheduled for April 18-19 here.

The symposium is aimed at bringing together law enforcement professionals and DP practitioners to discuss present and future law enforcement applications.

Additional information is available from Allen L. Pearson, Technical Research Services Division, IACP, 11 Firstfield Road, Gaithersburg, Md. 20760.

Destruction

Lost Records

Lost Facilities

Fraud

Lost Assets

Out of Business

Computer Security Seminar
Nov. 30 through Dec. 2, 1976
Presented by Suntech, Inc., computer arm of Sun Oil Company.

Attend these presentations and workshops, based on Suntech's practical experience, that evaluate security risks and implement cost-effective defenses.

Who should attend and why

Everyone involved in computer operations should attend this highly informative workshop. Data processing managers, auditors, systems analysts, operations supervisory personnel should be keenly aware of the scope and magnitude of the problems and threats confronting today's highly complex and vulnerable computer systems. Additionally, administrators, consultants, and representatives of government agencies will find the course most valuable.

With electronic data processing becoming, more and more, the heartbeat of commerce, security—in its many facets—plays an increasingly vital role. For any enterprise whose assets reside in its computers—one act of sabotage, one incident of carelessness, or one unanticipated act of nature can paralyze operations for days, weeks, even months. With a loss factor that could run into millions of dollars.

No "blue sky" theory here. The Suntech EDP Security Seminar is based on tried, proven methodology in effect at Sun's new data processing center in Texas. Sun, the nation's 37th-largest industrial, is a prime user of computer technology. Suntech, Inc., is a wholly owned subsidiary responsible for the planning, design, and operation of all Sun electronic data processing facilities.

Your seminar faculty will consist of four of today's leading experts in the field of EDP Audit and Security. Each is a practicing professional with a wealth of field experience in his area of discussion. When you leave the Suntech EDP Security Seminar, you'll take with you practical inputs with direct application to your own areas of concern. And you'll be better equipped to combat more effectively the invisible, as well as visible threats to EDP continuity.

What the seminar will cover

The Suntech EDP Security Seminar is an accelerated three-day workshop combining case studies, technical presentations and panel discussions to give you concise, up-to-the-minute practical knowledge of computer Threat Evaluation, Detection, Countermeasures and Contingency Planning. You'll be provided with a workbook and materials with which to record your information. Sessions will commence daily at 9 a.m. and end at 4:30 p.m. Topics to be covered in depth include:

How to get started—You'll be briefed on necessary organizational changes, such as: should security be a line function or a staff function . . . and to whom should the project leader report? You'll get inputs on approaching security on a project basis, and its implementation as a line function. And you'll get pointers on how to get *everyone* involved in security.

Physical Security—Hardware protection goes beyond alarms and locks. What EDP Security can and cannot accomplish, how it can minimize common threats such as fire, water, storm, sabotage, and utility failure. How security provisions differ for new and existing facilities. Building integrity, and the physical aspects of planning a new facility, e.g., type of construction and location; provisions for access controls including zoning and monitoring; laying out the utilities functions for UPS. Fire protection, from alarms and detection to extinguishment; preventive housekeeping and training.

Terminal and Network Security—An overview of areas of vulnerability, with recommendations for recovery capability. Making the initial contact for site survey, and pitfalls to avoid. On-site inspection and satisfying user's performance requirements. Asking the right questions to gain pertinent answers. Providing on-the-spot recommendations, and writing the post-evaluation report for feedback to local management. The final analysis and subjective evaluation.

Risk Evaluation—How to identify, quantify and rank potential loss risks due to intentional or accidental abuse of computer applications or stored data. Getting management to understand the extent of controls and the significance of intangible system safeguards. How to establish the proper objectives and approach to a comprehensive risk-evaluation study, with identification and selection of appropriate computer applications. How to determine criteria for a detailed examination, then collect and analyze the data.

Controls—More appropriately "internal security," controls are any measures which will help protect personnel, data, and equipment. You'll learn control

Software Tuning, Not Upgrade, Urged for 370 Sites

By Don Leavitt

Of the CW Staff

LONDON – Tuning both application programs and the operating system on a mid-range IBM 370 VS-oriented installation may make a hardware upgrade unnecessary even with a significant workload addition, a German consultant said here recently.

A three-day study of one site with two 370/145s running under VS1 found hardware could be cut back by eliminating an apparently unneeded alternate tape channel path, according to M.A. Cooke of Computer Program Products GmbH.

The installation uses one 370/145 for teleprocessing (TP) based on Tcam, the other for batch production and testing. The disks and tapes of the systems are switchable between the CPUs, with one IBM 3330 volume used for shared libraries, Cooke told a recent conference.

The monitoring periods, utilizing a variety of Boole and Babbage measurement products, lasted somewhat less than a day for the TP system and somewhat more than a day for the batch system.

Even in that relatively short time, however, several facts emerged quite clearly, he noted.

First of all, throughput on the production machine was improved by tuning the CPU time of a "very large" batch program that had been causing a bottleneck in the system, he said.

The study showed ways, for example, of recoding a data compression routine that had used 18% of the CPU time.

Switching his attention to the TP machine, Cooke said although the CPU and I/O power of the system was underutilized during the monitoring period, "there was the possibility of a page or memory bottleneck with the addition of more on-line partitions."

Several remedies might eliminate the problem, he said. Making those modules reentrant which at present have more than one copy storage was one of the first solutions Cooke suggested.

In more general terms, he said investigating long-term fixed pages to reduce their number should help, as should efforts expended to optimize the system residency lists.

Moving to a specific idea, he said dividing the SYSI page across two packs would reduce page delay time and improve the handling of a high page rate.

Similarly, a routine to reinitiate status records was reworked with expected CPU savings of approximately 5%. Overall, several "fairly simple" changes should yield savings of 17% to 18% – "considerable savings on a program with eight hours elapsed time," Cooke noted.

Making the principal indexes of all Indexed Sequential (Isam) files resident "significantly reduced" the CPU load of the Isam modules. Further gains can be expected in this area through the use of Vsam, he added.

Using double buffering on all sequential files heavily used is expected to reduce program runtime and increase the system's ability to overlay CPU and I/O activities, he said.

Just scheduling work in a more uniform manner has cut down machine idle time and prevented overload situations by separating the two biggest jobs, he added.

Implementing dedicated scheduler work area data sets has reduced time spent in initiation/termination functions. Optimizing the supervisor residency options and BLDL lists has also improved the system, Cooke told the group.

In terms of peripherals, Cooke found making the TP machine's printer switchable would help if there are printer bottlenecks for testing jobs. The tests also indicated the two-way switch on the tape drives was unnecessary, he noted.

classification, i.e., "input" controls, "processing" controls in which the computer performs self-auditing disciplines, and "output" controls. There are controls that govern separation of personnel function and duties, and restrict certain personnel from doing certain tasks, or occupying certain areas. There are administrative controls and authorization controls…all designed to act as fail-safe functions for every aspect of the computer system operation.

EDP Auditing—The changing role of the EDP Auditor from fraud detector "after the fact" to active participant throughout the system's life cycle. In his new role as management Devil's Advocate, his responsibility includes providing an objective appraisal of overall systems operations and identifying weaknesses which may lead to substandard performance. Attention will also focus on the EDP Auditor's participation in security and recovery, as well as systems testing, conversion, and implementation, all aimed at overall integrity and reliability of electronic data processing.

Software Security—All about internal programs and procedures designed to protect the integrity of both your computers and computer programs. Are data personnel prohibited from originating accounting transactions, adjustments, corrections? Do you have a formal change procedure that requires dual signature authorizations to help control system applications and software? You'll be alerted to operating systems vulnerabilities that can abort data integrity, and learn about the use of software algorithms and encryption packages for data base security.

Contingency Planning—Suppose your computer center contains thousands of mag tapes and hundreds of disk packs. In reaction to a published news story revealing that security is inadequate at many U.S. Government computer centers, management asks, "Do we have a suitable plan for protection and backup of vital computer files in case fire shuts down our computer center?" You'll find out how to develop a comprehensive contingency plan, evaluate all criteria, and make recommendations for appropriate action to take before, during, and after any kind of emergency.

Privacy—You'll be briefed on the important aspects of privacy as related to electronic data processing, e.g., from the standpoint of government legislation (Koch/Goldwater bill). . . state laws . . . and the effect of such measures on EDP management. We'll assess the HEW study on the subject, mandatory enforcement security policies, and the related costs. And we'll reveal the Sun position on these sensitive issues.

Where the seminar will take place

Suntech realizes that all work and no play makes for a dull three days, no matter how informative the sessions. That's why we chose Cherry Hill Hyatt House, Cherry Hill, New Jersey, as the scene for our seminar. Just 20 minutes from Philadelphia International Airport, it has all the "resort hotel" features you could wish for a lively seminar. The famous Latin Casino Theatre/Restaurant (where you'll see the shows "on the house" as part of the Seminar Package) is just down the street. Add golf (there are 18 holes nearby), tennis, swimming in the indoor pool, and some of the finest gourmet restaurants around. It all adds up to a three-day "brainstorm" you'll not soon forget!

How much it will cost

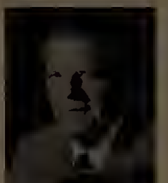
Total price of the Suntech Seminar is $525, which includes three breakfasts, three lunches, and two dinners . . . and entertainment at The Latin Casino. Of course you'll provide your own room, transportation, and beverages. Limousine service direct from the airport to Hyatt House is available. There you'll be met by Suntech attendants to help you check in and get oriented. During seminar sessions, we'll also have an Emergency Message Service (phone 609-662-3131) in effect so you won't miss an important phone call.

Attendance will be limited. Multiple reservations will receive a 10% discount for each attendee beyond the first one. DEADLINE FOR RESERVATIONS IS OCTOBER 25.

So plan, now, to attend. Fill out and mail the Registration Form right away and be ensured of one of the most informative and provocative seminars you've ever attended.

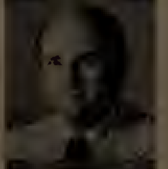
See you at Cherry Hill!

Seminar faculty



Joseph (Joe) R. Aicher
Suntech, Inc.
Joe (BS, University of Missouri—BS & MS, Drexel University) has been manager of Suntech's Data Systems Security Program for the past three years. His duties include responsibility for EDP security and right-to-privacy projects. Prior to that, Joe was manager of Suntech's Data Processing Department.

Ludwig (Lou) Stern
Suntech, Inc.
Lou (BS & MS, Columbia University and Drexel University) was largely responsible for introducing computers to Sun's Engineering back in 1959. He has prepared the specifications for design and construction of Sun Company's new multimillion dollar computer center, and had previously guided the security efforts for the company's numerous computer sites.



Roderick (Rod) M. Fancher, Jr.
Sun Company
Employed by Sun for the past ten years, Rod (BS & MBA, University of Alabama) is currently manager of EDP Auditing for Sun Company. In addition, Rod is engaged in developing risk evaluations and control guidelines. Earlier he had been a Lead Systems Analyst on several systems development projects.

Alan (Al) Douglas
Suntech, Inc.
For the last two years with Suntech, Inc., Al (BS & MBA, Rutgers University) has led physical, and software systems security projects. He also serves as Suntech's representative to an internal Right-to-Privacy Task Force. Previously employed with Exxon Corporation, Al brings with him over fifteen years experience in the data processing field

Registration

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NBS Scientists Win Four Design Awards

WASHINGTON, D.C. – Scientists from the Commerce Department's National Bureau of Standards (NBS) won four awards for significant new technical products this year in a competition sponsored by *Industrial Research* magazine.

Winners and their products are:

- James S. Albus of the Institute for Computer Science and Technology for development of a cerebellar model arithmetic computer.
- David E. Sawyer and David W. Berning of the Institute for Applied Technology for development of a laser flying-spot scanner.
- Helmut Hellwig of the Institute for Basic Standards for development of a rubidium portable clock (in cooperation with Efratom, Inc.).
- David W. Allan of the Institute for Basic Standards for development of a dual mixer time difference measurement system.

Albus' memory device, inspired by the human brain's subconscious computing centers that control such daily activities as picking up a drinking glass, is currently used as a servo controller for a robot manipulator and soon will be applied to machine tool control problems and to neurological and behavioral research.

Sawyer and Berning's laser flying-spot scanner displays in a nondestructive manner the inner workings of integrated circuits and other semiconductor devices.

The scanner can be used to assist in the design of semiconductor devices and circuits and in the detection and location of marginal device elements. It can help in establishing product reliability and in providing a tool for failure analysis.

Kids Cop 'Minor' Plea After Getting DP Subpoena

NO. OLMSTED, Ohio – Steven and Sheila Peto were subpoenaed here recently for failure to pay their Regional Income Tax Agency (Rita) taxes.

Steven, 7, and Sheila, 5, are brother and sister. Between the two of them, they had only $30.

The computer-printed subpoena requested the two to bring their 1975 earnings statements to court. But their father contacted City Hall, explaining the childrens' ages, and that was that.

Why the subpoenas? The Petos recently obtained Social Security numbers for the two so they could be entered in the *Cleveland Press* Social Security Sweepstakes.

The Social Security Administration routinely shares this information with states for tax purposes, officials said.

Announcing 635 megabyte 3350 compatible disc storage for medium to large System/370's.

The 3650 by Memorex.

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Editorials

The Conservation Quest

The computer is emerging as a key tool in the quest to conserve energy resources. In recent weeks, speakers at various conferences have emphasized the varied energy-saving programs now under way that are related to DP in some way.

Control systems have been used in newer buildings for some time to optimize the use of heating and cooling systems. Powering down temperature control systems when employees are not on the premises can save on fuel.

The use of microprocessors in home heating controls may bring the computer into the home in an unexpected way. Such systems could help to keep residences comfortable and save homeowners money on fuel bills in the process.

In the auto industry, microprocessors are helping to operate "lean burn" engines to get improved mileage from smaller, lighter cars often designed with the help of computerized simulation systems.

And the energy industry is using specially tailored software to evaluate the probability of finding new energy sources under promising land and ocean areas.

IBM recently announced a laboratory device that can power down a CPU when it is not in full operation. The company reportedly has a marketing group dedicated exclusively to energy conservation applications for the System 7.

Utilities are experimenting with load balancing of electric usage. And electric customers in one area of Vermont have been trying out a "black box" that restricts electric use during peak consumption periods.

Such black boxes, perhaps with small systems, may one day limit the use of high-energy consumer appliances, like electric dryers, to off-peak hours, thereby reducing the maximum energy levels that have to be produced by generating stations.

These various applications by themselves will not have profound effects, but each little step will ultimately reduce energy consumption.

As those who know what computers can do, people in this industry should help develop similar applications whenever the opportunities arise.

A Little Hard to Believe

The recent rash of IBM price hikes for maintenance seems aimed at forcing users of purchased systems to move to newer equipment.

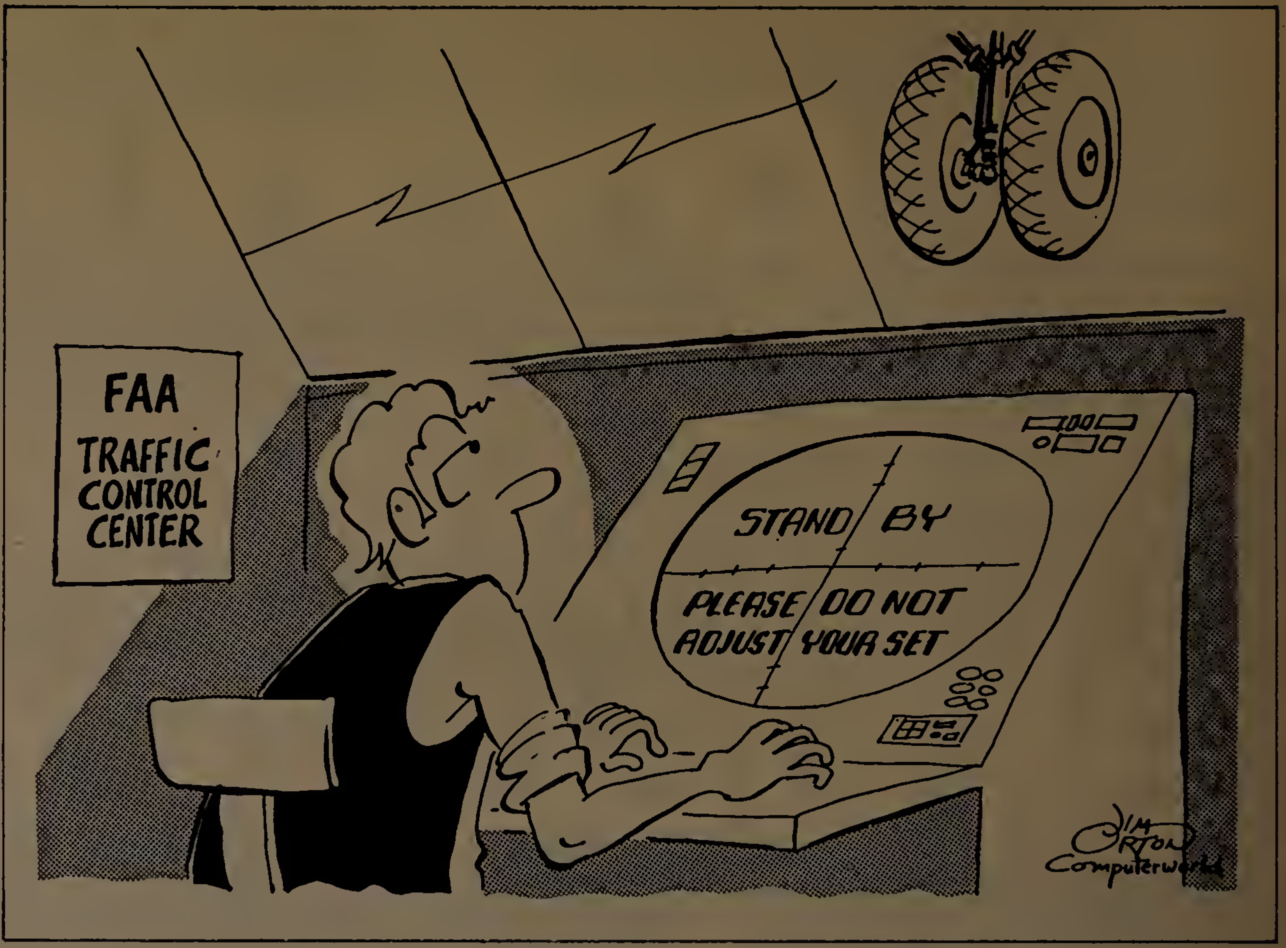
Many users install IBM equipment because they know a serviceman will never be too far away. This is especially important for users in outlying locations.

It is hard to argue with IBM's defense that the cost of maintenance and all the training and associated support is rising rapidly. Perhaps on that basis the recent increases are justified.

But maintenance can also be used to make the cost of operating equipment too high. As these costs creep up, the purchaser wonders why the recent price hikes did not apply to IBM's rental customers.

The third-party lessors claim the price increases were designed to squeeze their customers since CPUs on third-party leases are purchased machines.

The lessors may have a point. If, as IBM claims, costs are rising, then it is hard to believe it is more expensive to maintain a purchased machine than a rental machine.



Letters to the Editor

Mass Mailing Aims at Response, Not at Producing Perfect Label

The editorial regarding the label addressed to "Mr. Computerworld" ["Nobody by That Name Here," CW, Sept. 20] was entertaining, but possibly out of line.

The object of any mass mailing project is to trigger and receive a hopeful minimum percent of response, not to put out a perfect label to each and every addressee.

Just as the mailer tries for a certain minimum response from the mailees, he normally anticipates a certain acceptable error percentage. The cost to him for the service is predicated on this. Otherwise, the cost would be higher and, conceptually, out of line with little, if any, effect on the response percentage.

I believe we DP people have enough problems in our own areas without presuming to advise mass marketing people in theirs just because they use computer services for their accomplishments.

E. William Maxwell

San Diego, Calif.

Mass Mailing Problem Continues

I agree completely with the Sept. 20 editorial.

Unfortunately, this same week I received not just one, but three identical pieces of *Computerworld's* mass mail.

Perhaps CW can suggest a solution to this problem also.

Donald Weimer

Woodbury, N.Y.

For additional insight into this problem, see The Taylor Report on the opposite page. Ed.

Transparency vs. Translucency

In his article titled "Personal Initiative Only Way to Learn Documentation" [CW, Sept. 20], Joseph Rigo offered the following advice: "Learn the difference between good documentation and good writing."

Apropos to his advice, the following generalization is offered for comment: "Good writing is translucent; good documentation is transparent."

Lucid documentation is becoming more important yearly. Any exchange of information on the subject is to be strongly encouraged.

Joe McConnell

Streator, Ill.

It's Specific, Not Generic

Herb Grosch's column of Sept. 6 caught our eye here at Informatics, Inc.

We agree with Grosch that the name "Informatics" has some attraction for general use. However, the name is not a descriptive or generic term for DP in the U.S. (and other locations in the world), but is a name used since 1962 by Informatics, Inc., a software and computer services company.

The name is registered with the U.S. Patent Office as an official trademark and service mark. Further, the company has expended considerable money and effort to protect its rights to use the name exclusively.

We also agree that our industry needs a better name to call itself and the individuals in it. But it seems to us that "Informaticians" will go on indefinitely to refer only to those people who work at Informatics, Inc.

Walter F. Bauer
President

Informatics, Inc.
Woodland Hills, Calif.

Data Past

Five Years Ago
Oct. 6, 1971

NEW YORK – Hopes were all but dead for the preservation of RCA's Computer Systems Division by another manufacturer. Both Xerox Corp. and Control Data Corp. refused the opportunity to buy the entire division, but Xerox and Univac indicated interest in some parts of it. This uncertainty forced RCA users to order additional systems while they were still available.

– – –

NEW YORK – Three IBM 360/40s, a 360/50 and two RCA Spectra 70/45s combined to form a communications information network between the First National City Bank, Eastern States Bankcard Association and Marine Midland Bank's upstate computer center. The network provided bank charge-credit status information to participating merchants on Master Charge card holders in New York State.

Eight Years Ago
Oct. 2, 1968

LOS ANGELES – A joint suit filed by welfare recipients contended the computer system used for handling welfare checks was producing errors 10% to 25% of the time and another fail-safe backup system was necessary. No damages were sought in the action.

– – –

NEW YORK – Select, a computer system designed to aid students in selecting colleges was demonstrated at Harcourt, Brace & World, Inc., here. Prospective college students filled out questionnaires and the data was matched against courses and academic competition at 3,000 American colleges. On the basis of aptitude in 15 subject areas, a list of possible colleges was devised suiting the students' individual needs.

Sunk in Steerage

Once upon a lovely time, travel was romantic. And it wasn't just that I was young and eager, although certainly the first ten times across the Rockies are more fun even today than the tenth ten. No, it was a complex of nicer things externally, and not just my then delighted, now curmudgeonly, response.

For one thing, there was a variety of carriage. One flew Connies and DC-6s, and not a few DC-3s – but there were great overnight trains, and ocean liners (we call 'em cruise ships now). Watson Senior was a Cunard man; opinion in IBM in the late Forties was that they refurbished the Mary mostly to get him back.

And the planes, when they flew at all, flew low. You could see the Canyon, revel in the Alps, look up at Mount Wilson as you came into L.A. Airports were small – you didn't have to walk and walk and walk and walk.

Travel was something fewer people did. There weren't all the spoiled youngsters – just the college kids at Christmas and at term time. There weren't as many of *us*, going back and forth on computer safaris of dubious venue. Travel was something special; something important. You only did it casually if you were rich, or famous. Otherwise, unless it was an emergency, you planned long in advance, and carefully. And the anticipation was fun in itself.

Travelers, business ones especially, were treated well. If you had a bedroom on the Broadway Limited to Chicago, or a seat on TWA Flight 2 nonstop from International overnight – let alone something really exotic like a berth on a transpolar SAS flight – you were an honored customer, almost a guest. An Admiral or an Ambassador got his card for being a VIP, or a very frequent passenger indeed, not just by putting up a few easy bucks.

People on fancy trains, transcontinental buses, airplanes didn't wear gunnysacks, or overalls with sequins, and the heaviest weight mountaineering boots. They didn't lug clothes bags and tennis rackets and gigantic backpacks and guitar cases; not into piston-engine Corvairs, or the Ohio State Limited's roomettes!

Now they do. Now most people travel – welfare cases, little children, potheads, and streams of just plain ordinary men and women who used to stay home. They fill the roads to the airports, the parking lots, the boarding areas, the aisles and the overhead racks and the seats of the planes. They want things cheap. They want no surprises: Holiday Inns and McDonalds, not the Clift, not Christ Cella's.

And the airlines and the hotels and the restaurants conform. Once they catered to the sophisticated traveler, the one who would return often, commend expert service, tip generously. The novices, the casuals were to be educated up, shown how to stay at the Waldorf, eat at Chambord, fly Air France. Now, that's all reversed: the experienced traveler, the business executive, the peripatetic scientist is just a statistical fluctuation in a vast mess of undemanding slobs: people who sit unknowingly or numbly while Amtrak or Eastern or the Jack Tar grinds away.

How about a crusade? There isn't a hope in hell of doing much to improve steerage. As long as every high schooler and his great-grandmother flit hither and thither like only movie stars once did, the back of the plane, or bus, or hotel hallway is going to stay crummy. And those of us who get stuck back there will be treated at least as badly as the peasants, and often worse – if we complain, that is.

So my idea is, first class business travel again. Right now it costs about fifty percent additional on the airlines, and not much less to go to really good hotels: maybe forty percent. A great many organizations permit us to use good hotels and eat in the Scandias and Chez Carys already. The main blocks are two: the airline thing, and *per diem*. I suffered under the latter with Uncle Sam, for six years, and it's beastly; not just ridiculously low, and insensitive to the variations from New York to Oshkosh, but plebeian. The GS-6 and GS-16 both sit in squalor: the same squalor!

The airline fare, though, is arguable. Even at current rates, the impossibility of working in cramped economy seats, the expensive meals eaten after landing or before embarkation to avoid the horrid trays In Back, add plenty of invisible expense to the employer's costs. But first class, except to and from Texas, is often nearly empty. If enough business people were permitted to fly up front, the seats could be filled most of the time, and the differential reduced. Suppose it were only twenty or twenty five percent; would your boss let you Fly First? Ask him, and then let your favorite airline or the Airline Passengers Association hear if he says yes.

Perhaps the regulators would let up on First, and allow lines that want to be nice to passengers, like Continental, to experiment with lower rates. Let the pack-'em-in boys ignore first class; they do it poorly anyhow. But for the sake of us veterans, and the poor devils that have to do it often, let's make travel a little more fun!

Herb Grosch

Areas Suspected of DP Abuse Require Positive Action

The Taylor Report

By

Alan Taylor, CDP

It is now accepted that computer abuses can occur and many people take considerable trouble to avoid them by making appropriate system changes, file separations and other such actions. These actions may be enough to prevent the actual abuse itself but, unless they are amplified, they will still result in complaints of sufficient regularity that their existence should also be considered.

This may sound like a long story, but anything as powerful as DP must be expected to be feared and, therefore, must keep its skirts superclean. My mail clearly shows there is a continued questioning of all DP and I think that will continue.

One familiar instance is *Computerworld's* subscription solicitations. Year after year, CW uses mail solicitations to gather new subscriptions. These are sent to people who are on various mailing lists, thus opening the door to a possible invasion of privacy situation by using the lists to build dossiers about individuals – so-and-so reads this, is a member of that, holds such-and-such a position, etc.

In fact, although the lists could be used this way, there are precautions taken to ensure they are not so abused. Although CW literature is sent to people on each list, CW itself does not have possession of the lists themselves.

The literature is sent in bulk to a mailing organization which also gets a set of labels and applies them to the subscription cards. This way the comparative examination of information about Person X on lists A and B can't be performed by computer because no one has the computer-readable tapes of both lists.

These tapes remain with the owners of the lists and are not provided to the occasional users of them, such as CW. Therefore, privacy abuses are greatly limited.

Imagine the Rest

You can imagine the rest. Some people are on more than one list and receive more than one copy of the solicitation. And I start getting letters about CW hypocrisy based upon either the waste of trees or the technical incompetence in failing to search all the lists, compare the addresses, identify duplicates, triplicates, quadruplicates, etc. (At least with CW, I have never been sent more than five copies of a single solicitation – with other publications I have received up to 36 copies.)

This year, Margaret Phelan, CW's vice-president/circulation, included in the solicitation package an explanation card stating that while duplications had been removed as much as possible, they could still occur. In some cases, even this explanation was seized on as being proof CW knowingly sends out these duplicate mailings.

"The editors of *Computerworld* have clearly identified themselves with commercialism at the expense of DP professionalism," one director of computer services wrote. A senior systems analyst wrote that a return card indicating multiple mailings are being received could be used as a source document for entry into a preprint edit program before mailings are generated. Other methods have also been suggested, but these are sufficient to give the idea.

However, the correspondents overlooked the following:

- The cards bear different list stamps.
- The labels are printed with different address formats.
- Some computer typefaces are identifiably different.

The list stamps on CW solicitations are usually stamped in red to the left of the address label. Currently, lists are designated as CAM86, CAI86, LOF86, SBD86, RAC86, etc. (You can try working out the codes in use.)

The formats of the labels are even more different. CAI86, for instance, uses a five-line, 29-character format with the Zip Code on line 5 in positions 21-25 and a code identifier on line 2 in positions 24-29. LOF86, while also using a five-line address, has only 25 characters per line, puts its Zip Code in an earlier character position (position 20-24) on the fifth line and has its identifier on line 1, not line 2.

Explicit information and an invitation for positive action are logically unnecessary. But they are real actions which can help people who feel threatened by the very potential of abuse and, thus, are a practical necessity when handling abuse-potential situations.

The other formats are equally identifiable and differ in the number of lines, line lengths and field positions.

Looked at from an insider's point of view, these differences clearly indicate that at no time did one computer file exist for all the addresses. Yet, complaints continue because it is known that in this area there is a definite possibility of abuse.

Therefore, here and in other similar cases where computer abuses have been faced and, for the most part, solved, systems people must continue the positive action and bring the facts before the potential computer victims.

While Phelan's explanation card is clear and to the point, it could have been amplified (perhaps on the back) by explaining how to recognize different prospect lists and why List A was not compared with List B. At the same time, where there is a possibility of duplication, within a single list (as I found in SBD86), an invitation to return these duplicates would have provided positive action.

This additional, explicit information and invitation for positive action are, of course, logically unnecessary. Everyone who complained to me had enough technical knowledge to look at the formats and draw the appropriate conclusions. But the information was overlooked because it is only implicit.

Even within single prospect lists, where unnecessary duplication can and does occur, some real action is possible. Even though CW may only be able to act as a conduit and pass on the duplication information to the actual list owner, providing such a conduit would be a real action.

These points appear to provide guidelines for the systems work involved in handling suspected DP abuse areas. First, solve the abuse problem itself; then provide explicit information and real assistance for action to the people who feel threatened by the potential for abuses. Doing this is a very practical necessity when handling abuse-potential situations.

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Education Part of the Solution

Systems Development Lag Still a Reality in DP World

By Harold W. Worrall

Special to Computerworld

During the early days of DP, the sophistication of hardware lagged behind our ability to develop complex and interrelated applications.

Now the hardware, software and the applications are out of synchronization in the opposite direction. Each day new concepts of "total" systems are visualized and old visions of the same great concepts die.

We're on a wild goose chase. What are the reasons this systems development lag exists and what is the solution?

In discussing the systems development lag, it is important to note the common thread in DP, the implement by which systems are born and die, the human.

Why is it that hardware and software continue to progress in capability and systems applications lag? Software and, in particular, hardware are designed and built without the involvement of the user. Nor is it necessary, practical or beneficial to ask the end user how to design.

System applications, however, *require* the user's input into the design because it's his procedure, process and work activity you are automating and the system is one he will have to use each day.

How wonderful it would be if some one of us was great enough to know it all and design the system without the user, or if we could devise a piece of hardware to do diagnostic checks on a user to see if we are getting correct answers.

But we can't, so a further definition of our problem lies with the current philosophies of systems development.

Reader Commentary

One of the most pressing problems of the programmer/analyst is keeping current in his field. Modern hardware and software configured around such concepts as data base, teleprocessing and telecommunications affect the way we manage a systems shop, the way we design a system and the way we program it.

DPers are in a continuous education cycle and can't get out of it – it's time-consuming, expensive and necessary.

But this education cycle doesn't address the current problem of how to deal with a user in developing a system.

Management Problems

One of the most critical areas of any organization is the management. In my career, I have been associated with many fine managers and some not so fine.

Almost without exception, each poor manager had a heavy technical background and very little real training in the process of management. This general rule has proven valid.

What is the current philosophy in the DP world? We promote the technical man because the rest of us know it's a very difficult field requiring many years' experience and training to understand. The potential pitfalls are many and the consequences severe, so we give the job to the tunnel-visioned expert.

This is wrong! The investment of resources in systems development is huge and requires the expert in management.

Another current philosophy in DP is the schedule – make it and meet it. If the schedule included user testing, user documentation, systems training, user interaction time and implementation planning time, the cost analysis might not be so inaccurate.

Commonly these costs are not included because the user is not sufficiently involved. Even if he were, the person defining the schedule would be a technical man first and a manager second.

The consequences of this philosophy are systems that cost much more than anticipated and take longer to develop or systems that get "up" on time with no documentation and no user support.

The second situation is the worse one, but one would be surprised how many gold stars are handed out on systems that are "up."

There is only one thing worse than not involving the user, and that is forcing him to use a system which he was not involved in developing.

The most significant solution to many of these questions is education – not only the education of the systems people on hardware and software, but the education of top management, middle management and the end user.

The program of education is a continuous and a costly one, but the black box concept must be destroyed. To design a system of the sophistication continually prophesied in systems shops, this objective must be met.

A second suggestion is to promote managers with a DP background rather than DPers with a management background. Don't forget, the best man you're going to get is the one with both technical and managerial capability, but there aren't many.

It should also be a goal to promote people throughout the organization who have an exposure to DP. With the growing complexity of the business and government worlds, it seems inappropriate to promote those who will not make an effort to receive the training.

A third suggestion is to propose and maintain one DP plan. If your organization has decided your DP plan centers around the modular development of a complete information system for your organization and your divisions, districts, and/or suboffices are free to develop systems outside of that plan, you're in trouble.

Two offices can spend money faster than one and, when you're through, it will not be possible to interface the systems.

A fourth suggestion is to bite off a "reasonably" sized project from the complete system plan. The complete system concept is a part of the planning world, not the real world. By the time the complete system is done, it will be time to start over again.

A final suggestion that many will reject immediately is to select a middle management employee to act in the capacity of a project leader for a specific system development.

This suggestion assumes this individual is heavily trained in systems and in the specific hardware/software configuration with which he will have to deal. Accountability must accompany that responsibility.

Worrall is with Envirotech Corp. in Salt Lake City, Utah.

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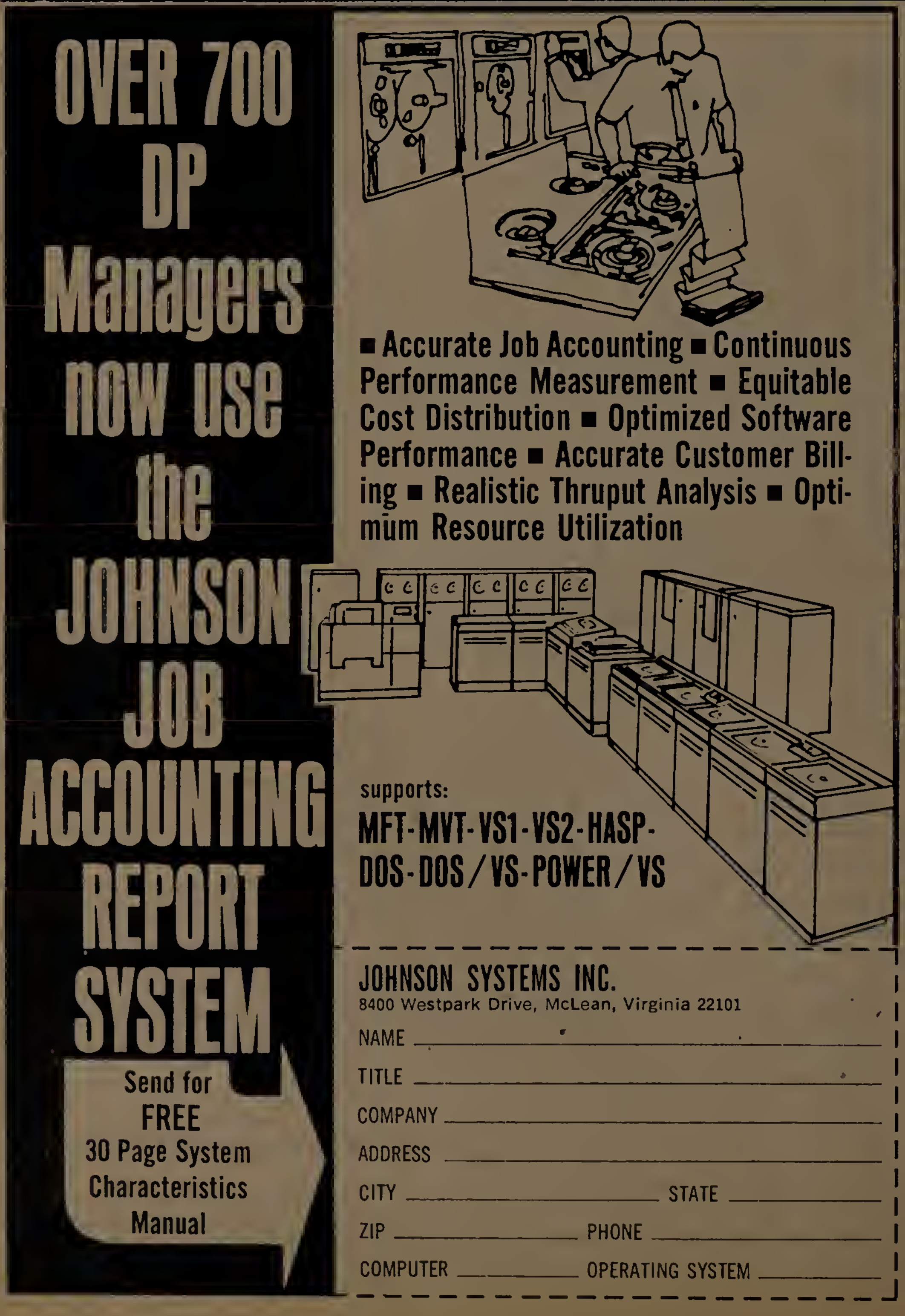
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Manufacturer's Staff Adapts IBM's 'Ipics' to S/32

By Kent E. Milnes

Special to Computerworld

CTS Microelectronics, Inc. of West Lafayette, Ind., a subsidiary of CTS Corp., has modified and installed IBM's Initial Production and Inventory Control Software (Ipics) package on IBM's smallest general business computer, the System 32.

This disproved the myth that a large, expensive computer is necessary to run a sophisticated computerized production and inventory control system.

The software package was modified by experienced DP personnel at the corporate level, but was installed and is maintained by a young business school graduate with manufacturing systems experience who did not have previous DP experience.

This dispelled a second myth – that smaller manufacturing companies must hire and be at the mercy of experienced programmers who often know little about the actual operations of the company for which they work.

A System 32 was delivered to CTS Microelectronics last December. By June, the applications of bill of material processing, inventory accounting and material requirements planning were operational.

These applications are modified versions of the Ipics packages which were designed to run on the larger and more expensive IBM 3.

CTS Corp. is extremely decentralized; there are 18 nearly autonomous operating facilities in widely scattered geographic locations. The interest in computer information systems at CTS increased in July 1975, when management recognized the economic potential of combining improved manufacturing software with lower cost hardware.

To investigate the use of decentralized small computers, a task force was organized. The objective was to determine the feasibility of installing low-cost computers and developing a set of specifications for these systems.

A quick survey of CTS companies which would be considered as candidates for low-cost computers revealed the following list of specifications:

- Hardware considerations dictated:
  (1) Disk capacity ranging from 7M bytes to 50M bytes.
  (2) Memory ranging from 16K to 48K.
  (3) A line printer with a minimum speed of 300 line/min.
  (4) Optional teleprocessing capability.
  (5) Inquiry terminals (desirable but not mandatory).
  (6) The potential for hardware enhancements with a minimum of software changes.
- Excellent hardware reliability was required by production management.
- A high-level language was needed to reduce development time, expense and the requirement for highly skilled technical programmers. A software package providing basic production and inventory control techniques was necessary to reduce these direct and indirect costs still further.
- A basic Production and Inventory Control System (Pics) package was needed which could satisfy the requirements of all 18 CTS companies.
- Both the high-level language and the Pics package had to be compatible at the source level over the complete range of hardware.
- It was highly desirable that the total monthly rental and maintenance costs at the smaller CTS facilities not exceed $2,500.

After soliciting bids from all known manufacturers of low-cost computers, we concluded the IBM line from the System 32 through the 3 would provide the hardware capabilities required.

The 300 line/min print requirement was relaxed and a system software requirement for error exception reporting to reduce print volume was emphasized. Strong preference was given to the System 32 whenever possible because of its price/performance.

The requirement for hardware serviceability coupled with the remote location of many of the CTS manufacturing plants led to the selection of IBM as a vendor. If the plants were located in or near large metropolitan areas, another vendor may have been selected.

Many high-level languages were acceptable including RPG-II, the language used by the IBM product line.

Ipics, with the four announced modules for engineering and production data control, product costing, inventory accounting and material requirement planning (production control and capacity planning modules have since been announced), did not cover all the necessary requirements, but it appeared to be a good starting point.

Although IBM literature did not state Ipics could be installed on the System 32, there were no obvious restrictions.

At this point, the apparent solution for most locations was the System 32 using RPG-II and Ipics. The system was justified for the first plant site and several IBM contacts were made to discuss the order.

Initially, IBM sales representatives were not supportive. They explained that the obvious alternatives were the Ipics modules on the 3/8 or the MMAS packages on the System 32. To choose outside these alternatives was not recommended.

A further analysis indicated potential problems with Ipics on the System 32 might be the nonremovable disk, which could cause backup problems, and the slow printer, which could be inadequate for Ipics output.

In actual practice, CTS personnel found backup takes only 30 minutes each week with the System 32. Most report printing can be accomplished on an exception basis, eliminating long print jobs. When long reports are necessary, they can be printed during the night.

Milnes is director of corporate planning at CTS Corp., Elkhart, Ind.

'Natural' Links Between User, System Seen Replacing Programmers in Future

By Edith Holmes

Of the CW Staff

WASHINGTON, D.C. – The day is coming when applications programmers won't be needed anymore . . . at least not to write code for specific jobs or problems as they do today.

Instead, these computer specialists will be responsible for identifying or facilitating the "natural interfaces" that will then exist between systems and their users, according to Frederick B. Thompson, professor of applied science and philosophy at the California Institute of Technology and a speaker at a recent conference here.

These natural interfaces – dependent chiefly on language and graphics – will permit users to write their own applications, Thompson said.

The second future responsibility facing the applications programmer will be the organization of data and the relationships between the algorithms that will manipulate that data, Thompson said.

Finally, the applications programmer will be responsible for organizing the devices to which the user will be attached in "writing" and executing the jobs he needs to do.

Thompson's vision relies on the notion that English and other "natural" languages will be the means users and programmers alike employ to communicate with systems.

Some systems are English-based already, he noted, adding thus far the use of natural languages works well where the subject matter is limited – as in the use of the block movement system to build a bridge or in the analysis of lunar rock material.

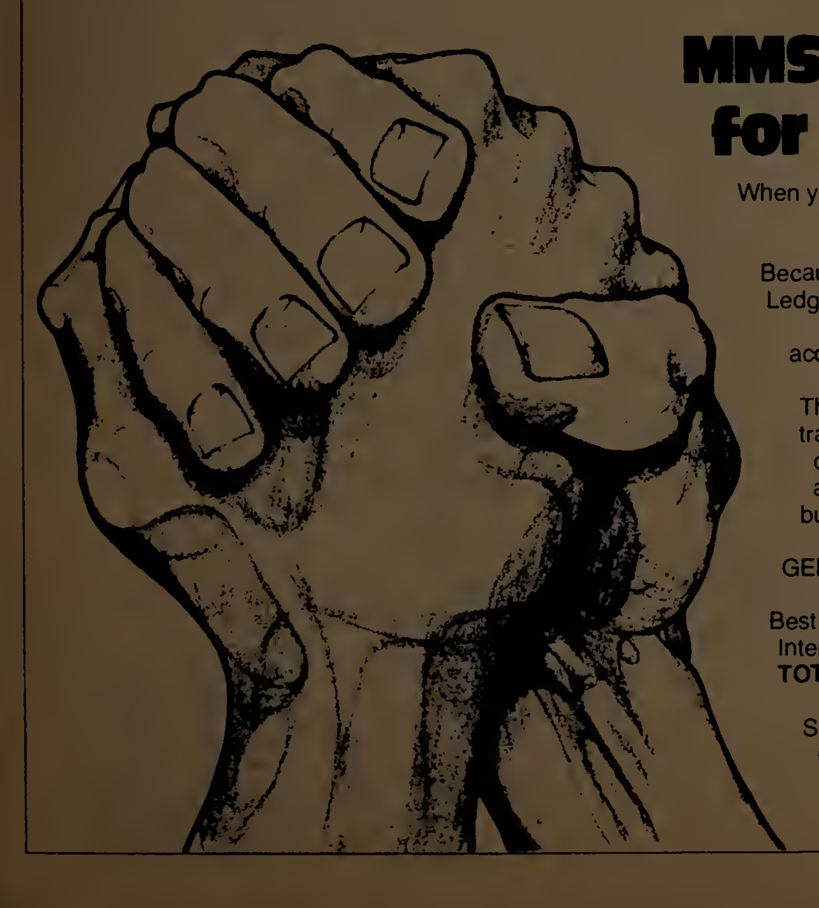
Because the understanding of the English sentence depends very much on context, the language is manageable in a computer system where subject matter, and thus context, is restricted, he noted.

But Thompson maintained large-scale use of English for a variety of applications is possible if the substantive words in the language are programmed separately from the function or little words like "a," "an" and "the" and from syntactic mechanisms such as the function of a pronoun in a sentence.

Thompson sees a movement toward the use of English and graphics and away from application-specific programming in part because he doesn't believe the promises of "hardware types" that partitions won't be necessary when improvements in memory size and access time have been improved by an order of magnitude each.

Thompson also foresees some functions being carried out by microprocessors that form part of the hardware rather than by the code that is written today.

The definitions of what is software or firmware or hardware will change over time for the same program, he explained, emphasizing the notion that more software will be provided through hardware.



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Institute Source Reacts

Stevens Gave 'Flavor' of Software Physics, But...

By Roger P. Novach
Special to Computerworld

First, let me say that I am a senior consultant on the staff of the Institute for Software Engineering [founded by Ken Kolence to provide a center for the development and teaching of software physics]. This will enable readers to make allowances for my bias.

Second, the following remarks are my own, not Ken Kolence's or any sort of "official" commentary by the institute.

Lastly, I would like to say I truly admire the way Barry Stevens was able to keep an even keel [CW, Sept. 20] in spite of the fierce crosswinds from ardent supporters and vehement opponents. Given the very severe limitation of space, he did a fine job in communicating the flavor of a very different approach to explaining a familiar, if complex, set of phenomena.

Now for the "buts" and "howevers" . . .

First, a couple of items in the exposition of software physics need adjustment or amplification (partly because of some typographical accidents). I will start with the whole set of concepts surrounding work, software work vectors, power and the popular SMF-based reporting and billing packages.

Change in State

Work is done when a change in state occurs (this is straight physics). In this case, in practical terms, a *unit of work* is performed when a *byte is transferred* (written) *to* a storage medium by a processor for a software unit.

A full workload or any mentally separable part of it may be characterized by a vector whose entries are the *work* done by each system component in executing that workload.

The system components may be any reasonable partition of the full system such as equipment classes (CPU, tapes, disks, etc.) or subconfigurations (CPU, chan 0 configuration, chan 1 configuration, . . .) or groupings of subconfigurations (CPU, byte multiplexer configuration, selector channel configurations, block multiplexer configurations, . . .) or what have you.

I have gone over this ground because the illustrative array in Stevens' article may be misleading. The first column is headed "SEC CPU" which would be a time measure, not work.

Most readers would assume the other columns are I/O counts (EXCPs). They should be units of work. Work is fundamental – and primary.

Because present instrumentation limits our ability to directly measure CPU work for a subworkload and present recording methods do not keep accurate totals on I/O work by subworkload, it is necessary to resort to estimating and approximating techniques in practical situations.

One way to do this is to measure (with a hardware monitor, for example) the power of the CPU on some typical full workload and then use the fact that

WORK = POWER X TIME

to estimate from CPU time the work done by the CPU for some software unit. The same thing can be done with block sizes and EXCPs.

Keeping all these qualifications in mind then, the polynomial and the discussion of the Boeing and Value packages follows. If it were possible to directly measure work, then the story would be completely different.

I know this sounds like caviling, but if we do not keep our thinking about fundamentals clear and precise, then we will find ourselves back in the foggy thicket again.

One more nit: the capability to do work is energy. Power is how much work can be done in a given time. Power is the capacity to do work.

Anything New?

One other large issue which was very distressing to me as a general intellectual problem was the muddy discussion of whether software physics "contains anything new." It revealed a very poor understanding of the nature of theory construction and the role of theory in the development of any field, especially one with practical applications.

Stevens' remark ("But software physics provides a method . . . And *that* is new to DP.") is right on target – and, in fact, could have been generalized.

By the logic of the remarks cited, Newton's mechanics "contained nothing new." It did not change any of the standard observations or measures of mass and motion – nothing in the world or in common practice was changed.

All Newton did was analytically arrive at a few postulates ("laws of motion") about an idealized universe (remember that you always had to "ignore friction"), tossed in a few logical fictions (force operating at a distance) and more or less redescribed what everybody already knew. What's new?

And yet the poet wrote, "And God said: 'Let Newton be,' and all was light."

Some slightly unfortunate syntax made it seem that Dan Momjian is saying software physics is some kind of cost allocation scheme. One application of software physics is providing a sound basis for cost accounting and billing in DP.

Space is too short to enter into a proper discussion of time, processing delays, turnaround time and service levels. It is my belief that both Stevens and Kolence are right. I think that these matters have not yet been covered in the developed work in software physics.

I also believe they can be handled by natural, straightforward software physics methods based on the existing definitions and present work on time.

Correction

In "'Software Physics' Standardizes DP Operations" [CW, Sept. 20], the fourth column should have started with the line reading "data from one storage type to another" in the fifth paragraph of that column.

The text from there to the bottom of the page should have been followed by all the text that appeared at the top of the column.

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Social 3:00-4:00 p.m.

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Seminar Leaders

Robert J. Davis – Mr. Davis is Regional Marketing Manager for Database Systems. He has extensive experience with most aspects of database system design and usage, and has held key positions with both IBM and CINCOM. He is responsible for the marketing of database products in the U.S. and Canada, analyzing competitive products, and finding new markets for database technology. Mr. Davis holds a B.S. degree from the University of Akron.

William E. Linn – Dr. Linn is a member of the Cullinane Corporation Senior Technical Staff. His responsibilities include IDMS training, database consulting and technical marketing support. He was previously with Southern Railway System in Atlanta where he was deeply involved with database administration activities with IDMS. He has his Ph.D. in Computer Science from the University of Michigan and has been associated with the Georgia Institute of Technology teaching data structures and list processing techniques.

Raymond J. Nawara – Mr. Nawara is Southwest/Plains Area Manager of Cullinane Corporation. He has had extensive experience with the design of health and patient-care systems. Previously he was the Data Base Administrator at the Health and Hospitals Governing Commission of Cook County, Illinois where he had extensive experience using IMS. He has consulted in Database Applications for a variety of clients. Mr. Nawara is a graduate of the University of Houston with a major in Mathematics and Computer Sciences.

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Status of Women on DP Staffs? Survey Could Give Hard Facts

By Jack Stone

Special to Computerworld

The Human Connection

Dear Jack:

I have been disappointed you have not discussed a subject clearly of vital concern to many readers: the long-existing discriminatory practices by American organizations against women in skilled jobs, particularly in computing centers.

It was as an executive secretary to the president of a small computer services firm that I learned of what I believe to be unfair personnel practices in the industry. But like many other women in business, I felt my livelihood was in jeopardy and I did not speak out at the time.

Now, gratefully, times have changed much for the better. Not only are more Americans supporting the rights of women, but the Federal government has taken an active role in supporting women workers.

I strongly recommend as required reading for women in the industry "'. . . To Form a More Perfect Union . . .' – Justice for American Women," a report of the National Commission on the Observance of International Women's Year (U.S. Government Printing Office, Washington, D.C. 20402, June 1976, $5.20).

Recommendations of the commission that I feel particularly relevant to DP jobs for women are those contained in the section entitled "Upward Mobility for Secretaries."

These recommendations include:

- Secretarial jobs should be viewed as a major access route to DP professional and technical jobs, as well as a career in itself.
- Information on DP job opportunities as well as training programs for entry-level DP positions should be made available to secretaries at all levels.
- Administrative supervisors should be involved in the career development programs for each member of the staff and should be carefully trained to evaluate individuals in terms of acquired skills and past performance – not in terms of previous job titles.
- The prime source of talent for filling entry-level vacancies in DP professional and technical jobs should be current employees.

I would be interested in your views regarding programs in the computer center environment to develop and transfer women members of the secretarial and administrative staffs for professional and technical positions.

Sandra H. Cunningham

Washington, D.C.

* * *

Dear Sandra:

Because of the complexity of issues raised in your letter, I'd like to comment on it and invite our readership to take part in a survey (see box) intended to provide current data on the progress of women toward DP professional/technical positions.

Obviously the more survey responses the better, but in any case I'll tabulate and analyze whatever replies come in and report my findings in a later column.

I believe the presence of women in DP slots is widely accepted, probably more so than in any other professional segment of the American industrial society. In this sense, I don't support the charge that computer center hiring and promotional policies are discriminatory.

However, I agree with you that secretarial jobs are rarely steppingstones to DP careers. The reason is simply an economic one in the minds of the managers – it's cheaper to hire experienced professionals from the outside than train non-DP people from the inside; no significant weight is given to the value of increased commitment and morale from on-board people or the costs involved with discharging the experienced new employee who doesn't work out.

There are, of course, exceptions. A small percentage of centers is looking at programs to upgrade administrative personnel to satisfy Equal Employment Opportunity regulations as the centers interpret them.

More to the point, the overall participation of women as professional/technical computer center employees is well below 50%, the obvious ultimate goal. I would estimate about 12% of the total DP jobs

(Continued on Page 23)

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Stop Talking, Start Using Them

Software Engineering Ideas 'Well-Rooted in Math'

By Edith Holmes
Of the CW Staff

Concepts and Techniques

WASHINGTON, D.C. – A debate on the pros and cons of software engineering? Why, that's like a debate on apple pie!

So said J. Robert Wood of IBM's Federal Systems Division, who chaired the proceeding at a recent conference here.

It's as hard to hate all versions of the idea of applying discipline to the creation of software as it is to dislike all forms of the American dessert. Both encompass a variety of approaches, and these require some definition and clarification now and then, Wood said.

Accordingly, Harlan D. Mills of IBM and Barry DeRose of the U.S. Secretary of Defense's Office squared off to explore the issues.

For Mills, software engineering isn't hard enough. "There's a difference between using the names for it and employing the ideas behind it," he said.

The "ideas" Mills advocates are "well-rooted in mathematics" and are intended to be guards against the faulty reasoning he said occurs so often in the development, design and writing of software.

"We've only had 25 years of software building. That's a terribly short time for any human endeavor," he said.

"Most of today's software practitioners didn't learn software engineering in school. But while it's important to recognize we're doing something that is difficult and that has only been practiced for a short time, we have many people doing it badly."

Calling the learning of software engineering "a tough mental proposition," Mills suggested the only way to become proficient in its concepts is to use them. "We need more rigor now to make programming easier in the long run," he said.

"A systematic approach to stepwise development and design will produce programs that will run," he stated. "The universities are now turning out people who program effortlessly and flawlessly."

Software engineering will get easier in the next 10 to 15 years, Mills predicted.

Everyone agrees the writing of software requires more discipline, especially in requirements analysis and in the involvement of the user in a program throughout its creation, DeRose said.

What concerns him is the term "software engineering" itself. By calling this discipline "software" engineering, "we dichotomize software from hardware as if they don't go together," DeRose stated.

"We imply they can be separated and treated differently, especially when we're talking to top management," he added, suggesting "systems engineering" might be a more useful term.

But any of these terms carries with it the problems inherent in using "buzz words," DeRose said. "They look good on viewgraphs; they make it look like we're up with the state of the art and all that jazz."

They impress top management, he added, and "it has taken me a long time to convince my own management in the Department of Defense of the danger of these terms.

"Today, if someone says 'software' to the Secretary of Defense, he almost has a heart attack," DeRose said, noting he prefers this response to a reaction indicating his management perceives software or its engineering as a panacea for problems.

Like Mills, DeRose said he believes "we need to begin to do what the term 'software engineering' implies we do. We are beginning to know now how to put discipline and rigor into software engineering."

The question for the future, he added, is: "When have we had enough? When do we stop?"

Census Data Bases Aid EEO Reporting

MONTVALE, N.J. – Information Science Inc. (Insci) is now marketing customized statistical data bases extracted from 1970 Census figures on external labor markets to be used in conjunction with the company's Expanded EEO Compliance System.

The data bases, developed by Kellex Data Services, provide comparative information so a using company can demonstrate the degree of its compliance with the federal Equal Employment Opportunity (EEO) requirements, Insci said.

Since users only need data for labor markets in which they have locations or to which they are considering a move, the cost of the Kellex data base varies, Insci said from 95 Chestnut Ridge Road, Montvale, N.J. 07645.

Survey May Suggest Role of Women in DP

(Continued from Page 22)

are held by women (though I know of one particular very large operations center which has a nearly 100% female staff).

Another note is that of the 400 or so people in the dozen DP management and technical classes I have produced or taught this year, only 3% were women. My conclusion is that DP management has increased the selection of women over the years, although it has generally not implemented aggressive training and development programs to accelerate progress.

Responses to the accompanying questionnaire will provide some reasonably hard facts about the ratios of men and women in different job groupings if the respondents are as accurate as they can be.

The information for any specific installation will be kept confidential; we ask installation identification simply to avoid including any shop more than once in our analysis.

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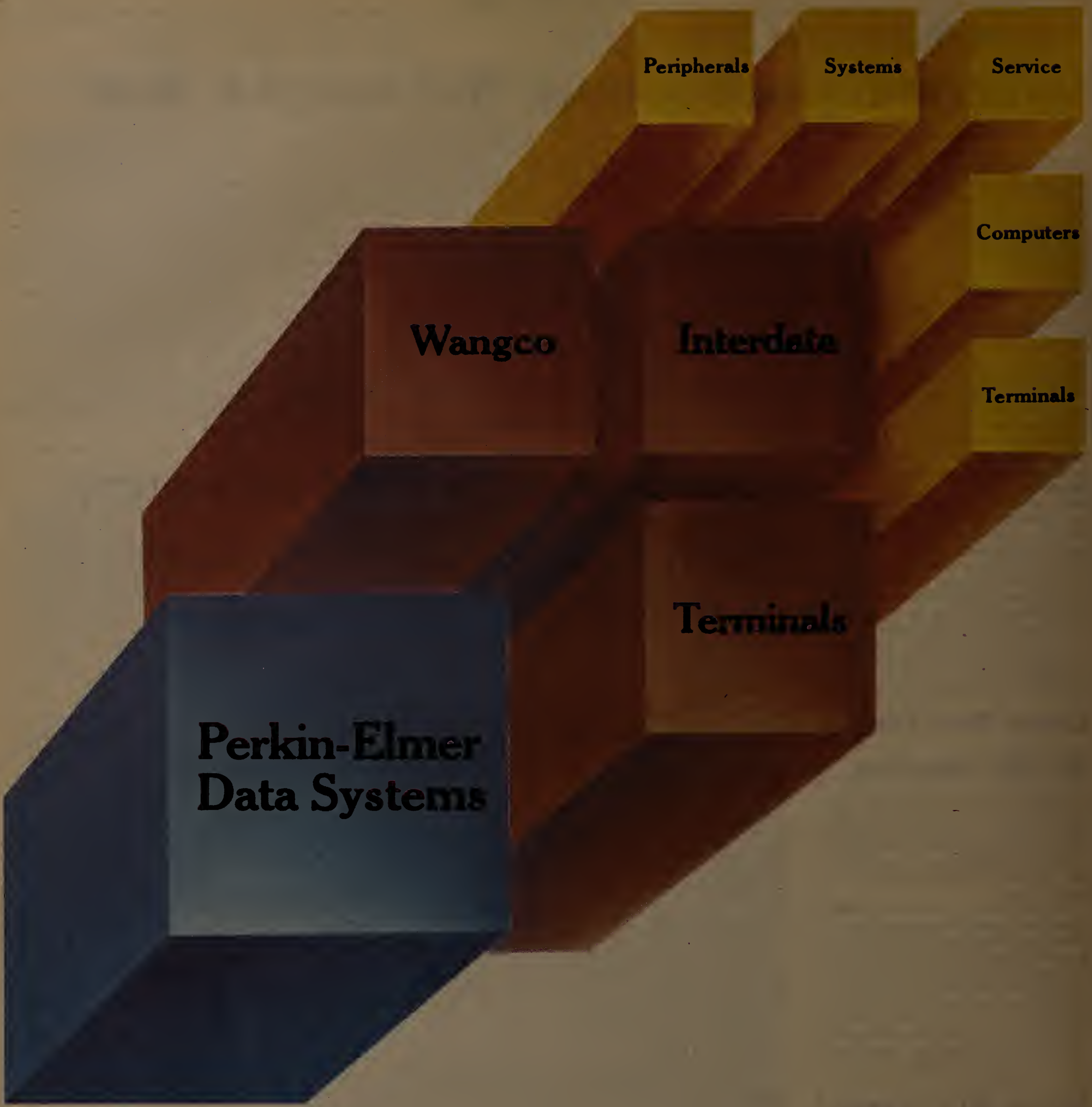

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Data Briefs

Digi-Log Line Monitor Diagnoses Net Malfunctions

HORSHAM, Pa. – The DLM II from Digi-Log Systems, Inc. is a line monitor for isolating and diagnosing data communications network malfunctions, according to the vendor.

The device displays the data characters and the control characters that flow on a transmission line on a CRT screen, enabling the user to spot problems as they occur and identify the cause, the company said.

Three major applications areas for the DLM II include network control centers; workbench testing of hardware and software; and at field service or remote sites, a spokesman added.

Problems with transmission lines carrying data at up to 9,600 bit/sec rates can be viewed on a 640- or 1,280-character CRT screen, he said.

The tester has the capability to address a variety of codes and protocols such as synchronous, asynchronous, bisynchronous and Teletype, the vendor noted.

The DLM II is available for immediate delivery and costs $2,495. Digi-Log is at Babylon Road, Horsham, Pa. 19044.

Prentice Has Synchronous Modem

PALO ALTO, Calif. – Prentice Corp. has introduced a full- or half-duplex 2,400 bit/sec synchronous modem for transmission over common carrier leased lines and dedicated transmission lines.

The P-201B modem operates in the same system configuration as Bell 201B data sets, the company claimed.

An LED display monitors the status of key data control signals. The unit includes facilities for both line and data loopback testing, Prentice said.

The P-201B has an RS-232C interface and all Bell 201B options are standard or strap selectable on the Prentice model.

The basic P-201B costs $625 from Prentice at 795 San Antonio Road, Palo Alto, Calif. 94303.

LDS Reduces Modem Price by $945

LIVERMORE. Calif. – Livermore Data Systems, Inc. (LDS) has reduced the price of its MOS/LSI 440/48 modem by $945.

The single-card device is a true 4,800 bit/sec modem although it is capable of split-streaming two 2,400 bit/sec lines, according to a spokesman.

The 440/48 is intended for full-duplex, synchronous data transmission and was designed for point-to-point networks.

The modem is priced at $1,995, the spokesman noted from 2050 Research Drive, Livermore, Calif. 94550.

Data 100 Upgrades, Enhances Model 77

By John P. Hebert
Of the CW Staff

MINNETONKA, Minn. – Data 100 Corp. has upgraded the communication capabilities of its Model 77 key-to-diskette data entry system and has enhanced the system to include concurrent data entry and line-to-print facilities.

The Model 77 Communication System is said to incorporate full batch communications and data entry features and utilize removable diskette storage.

Depending on the system configuration and options selected, communications features provide the ability to send entry data or receive card data, print files and system programs while entry operations continue, the company said.

The Model 77 will communicate with any mainframe operating system which is compatible with the IBM 3780 binary synchronous communication (BSC) discipline, according to a spokesman. It is scheduled to include IBM's Synchronous Data Link Control next year, he noted.

The 3780 discipline supports peripheral data streams using a nonmultileaving mode in a CPU-to-terminal or terminal-to-terminal configuration, he said. The system supports the standard 3780 space-compression scheme and allows transmission of Ebcdic codes in transparent or nontransparent modes through the Model 77's 3780 emulator, he added.

Data 100 Model 77 Key-to-Diskette System

Communications features available on the Model 77 include point-to-point or multipoint transmission, RS-232 capabilities and 2,000- to 9,600 bit/sec communications facilities.

The system communicates over dial-up or dedicated, two-wire or four-wire lines and has auto-answer capabilities, according to the firm.

Enhanced communications features over Data 100's initial Model 77 [CW, Dec. 3] include an upgrade from 4,800 bit/sec transmission speeds and the addition of dual-modem switches and modem-pair simulators and data compactors, the firm noted.

Data Entry Features

Data entry features allow the user to enter, edit and store data on diskettes under control of preprogrammed data entry software using one or two entry stations, the spokesman indicated.

Traditional field edit features are enhanced with fixed entry validation, accumulators, arithmetic functions and I/O formatting, he noted.

After generation and entry of appropriate formats on the system, application data may be entered from the keystations under format control and stored on diskettes in identifiable batches.

The entry station features a movable keyboard. The system's CRT monitor displays characters in 8 lines of 32 positions each for a total of 256 characters.

The Model 77 comes with two diskette drives and can accommodate up to three. The number of drives required depends on the number of entry stations (one or two) in the system, he said.

The unit uses IBM media-compatible diskettes and each diskette contains over 250K bytes of data on 77 tracks.

A basic Model 77 with communications capabilities, two diskettes, a single keystation, the local forms feature and a 62 line/min printer costs $570/mo on a one-year lease including maintenance. It can be purchased for $19,320, the spokesman said.

Price for the second keystation with a third diskette drive is $660/mo or $22,344, he added.

First shipments of the Model 77 are scheduled for November, the spokesman said from 6110 Blue Circle Drive, Minnetonka, Minn. 55343.

Food Supplier Develops Network

By a CW Staff Writer

CHICAGO – A distributor of "fast foods" here developed a computer terminal network to maintain tight control over inventory and product distribution from regional distribution centers in the U.S. and Canada.

The Martin Brower Co. needs quick turnover of the goods it supplies fast food chains from its 20 product distribution centers.

Time constraints require Martin Brower to take an order, process it and deliver the merchandise requested in three days' time, according to Jim Eckberg, DP manager of the company's management information systems.

Although the firm had only Western Union TWXs prior to 1968, the growth in the food industry demanded equipment upgrades through various computer terminals including Data 100 Corp. models and Comdata Corp. units since 1968.

The food supplier presently has an IBM 3741 CRT and an IBM 3717 printer in each regional distribution center where orders are taken and at the main office here, Eckberg said.

Order information is taken over the phone at the regional centers. They are transmitted in batch mode through Bell 201C modems and Bell dial-up lines at 2,400 bit/sec to a 240K-byte IBM 370/135 host CPU here with four spindles of IBM 3330 disk and five IBM 3420 Model 3 tape drives, he said.

The information is stored for later use in inventory control, purchasing of goods and customer service records, although that same night, the CPU prints out invoices at the printer terminal of the proper distribution center.

The 370 CPU contains all information pertaining to the layout of every regional center, where products are stored in those warehouses.

The volume of items and the total weight of the order are also calculated to aid regional center employees at the time of loading.

Order quantities for the individual outlets range from 80 to 300 cases with the product mix including frozen refrigerated and dry goods.

This represents a daily average of over 1,200 orders with over 30 detail items per order – or about 3.6 million characters transmitted each day over the network, Eckberg said.

Net News Needed

A special report on data communications networks will appear in *Computerworld* on Nov. 29.

The report will focus on network configurations and applications as they apply to data communications users.

Articles in the report will contain details of equipment, carrier services, protocols, teleprocessing software, etc.

Readers who would like to contribute articles to this report should contact Ronald A. Frank at CW to discuss story ideas. Articles should not exceed 1,200 words (about four double-spaced typed pages) and are due by Oct. 14.

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Pertec Introduces Telebatch Capability

MARINA DEL REY, Calif. – The CMC Division of Pertec Corp. has introduced the Telebatch communications capability for the CMC 1800 key processing system.

Telebatch communications capability is provided only through utilization of both CMC System 1802A software and CMC communications controllers, according to a spokesman.

The capability enables 1800 processing systems to communicate with one another or with IBM 360 and 370 series mainframes and with IBM 2780 or 3741 terminal equipment over a dial-up switched network or dedicated line, he said.

Bisynchronous communications (BSC) protocol simulating 2780 card entry allows transmission from local disk or magnetic tape to 360 and 370 systems, CMC noted. Data receipt from other key processing systems or IBM mainframes is also accomplished by simulating the 2780, the company added.

To achieve data transmission rates up to 4,800 bit/sec, a CMC Model 1455 communications controller is necessary, the spokesman noted. The 1802A software is included at no extra charge, he said.

Telebatch BSC rates for the 1800 system range up to 19.2K bit/sec. However, a CMC Model 1456 controller in addition to the Model 1455 is necessary to effect the speeds at the higher end, the spokesman said.

An RS-232C interface is standard and utilizes Bell 201A modems or their equivalent. An optional eight-bit transparency code is available for remote job entry, while an Ebcdic code is standard with the 1802A, CMC said.

Standard 400-byte 2780-compatible buffers are expandable to 976 bytes to perform data compression of strings, the spokesman added.

A resource allocator has also been added to the 1802A operating system to enable users to partition core at tape load time, the company said.

The Telebatch capability costs $3,300 for transmission rates up to 4,800 bit/sec, including maintenance and a 1455 controller. For an additional $1,200 – covering the cost of the 1456 hardware – the higher speeds can be achieved, the spokesman noted.

The CMC Division of Pertec is located at 2500 Walnut Ave., Marina Del Rey, Calif. 90291.

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Coastal Has 'Smart Clock'

MIAMI – The "Smart Clock" from Coastal Data Services, Inc. is a microprocessor-based badge reader/data collection and communications terminal.

It is intended for time and attendance, inventory control and job cost reporting applications, a spokesman said.

The terminal can operate in either on-line or stand-alone mode. Data is relayed to the host processor in Ascii, asynchronous mode through an RS-232C, 20mA current loop or built-in 600 bit/in modem interface, according to the spokesman.

In the stand-alone mode, the device collects information independent of the host CPU. Typically, a day's worth of data can be transmitted to the host in a few minutes, the company claimed.

The Smart Clock reads up to 16-digit codes from standard 80-column Hollerith punch cards, according to the spokesman.

Standard features include 1.7K bytes of factory programmed read-only memory (ROM) and 2K of memory for data storage, although 14K of memory storage is available, he added.

The terminal reportedly checks each transaction for validity and signals the user if a transaction was valid or void through the utilization of indicators and an audible alarm.

Prices for the terminal start at $1,800 for the interface, 1.7K ROM and 2K of storage and go up to $3,100 with the addition of 14K storage memory, and 22-digit number reading capability, the spokesman said from 1592 N.W. 159 St., Miami, Fla. 33169.

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CRT Net Cuts Firm's Paperwork, Saves $30,000/Year

Terminal Transactions

DALLAS – Being "bogged down with paperwork" has its benefits – it forced a large cement supplier here to install a computerized data collection/order entry terminal system that reportedly saves the firm $30,000/year.

"We had to have something" to alleviate the amount of clerical time and errors that caused delays in billing, according to a General Portland, Inc. spokesman.

The stages of bill preparation were so numerous and behind schedule that "the paperwork was killing us" – even though Teletype Corp. Model 28s were helping to speed up the billing transaction process, the spokesman said.

After studying the problem "for a long time," General Portland installed a Sanders Associates, Inc. 810 dual minicomputer-based CRT terminal system to help prevent lost documents, reduce clerical errors and ensure on-time billing, he said.

The system enables personnel at General Portland's Trinity Division here to retrieve remotely stored computer records from the headquarters office five miles away and display them on Sanders 810 CRT terminals for processing.

About 3,000 transactions are handled by the terminal system each day, he noted.

Sanders 810 CRT serves as console for Burroughs CPU at General Portland, Inc. headquarters.

An 810 minicomputer controller is located at both headquarters and the division here. These controllers handle a total of eight 810 CRTs and two Sanders 88 char./sec printers, the spokesman said.

The division's system operates on-line to headquarters' Burroughs Corp. B3700 with 250K bytes of core, six 1,600 bit/in. tape drives, two spindles of double density disk and two modules of head-per-track disk.

The 810 terminals are programmed to emulate the Burroughs TD820 CRT using a software package developed by Sanders. A Burroughs standard language is used to generate the communications handler, he explained.

One 810 system with two CRTs is "direct connected" to the B3700 through a Burroughs standard synchronous adapter at 9,600 bit/sec. No modems are used as the 810 controller supplies the clock, he noted.

Other CRTs are utilized for auxiliary computer console functions and to design and test CRT formats and programs.

The other 810 controller with six CRTs and both 88 char./sec printers is connected to the B3700 through a Bell-supplied private data circuit between the DP center and the Trinity Division, according to the spokesman.

This dedicated line is anchored on both ends by ICC/Milgo Corp. 5500/96 modems operating at 9,600 bit/sec, he added.

The system has taken a considerable load off the central processor, according to Jon Dell'Antonia, director of General Portland's Management Information Systems.

"Our programming is such that all 'must fill' fields have to be completed before the information is sent to the CPU. This eliminates sending all the information to the B3700 and then having to send it back for corrections or inserts," he said.

The company manufactures cement at eight plants in the U.S. When an order is received at the Trinity Division, the customer's number is typed on the keyboard of the display terminals which are on-line to the remote computer at headquarters, Dell'Antonia explained.

The system communicates the customer number, product number, quantity, how it will be shipped and other pertinent data to the terminal for display.

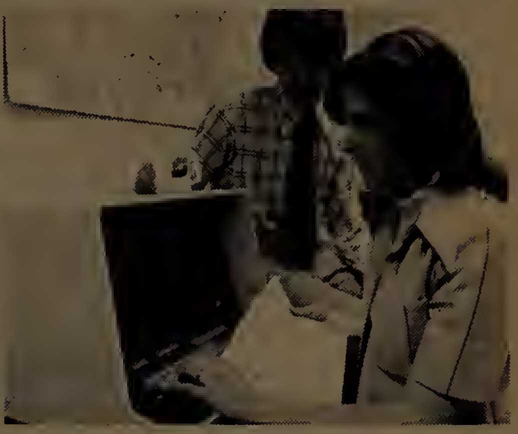
A clerk then types in the delivery schedule and sends all the information back to the computer which automatically generates an order and prints out a bill of lading at the division office, he said.

This information is then sent over the private line Teletype network at 10 char./sec to the cement plants and to the carriers involved in hauling the shipments.

This network provides a hard copy for the shippers and plants. It also includes very detailed instructions as to where the cement is to be delivered – often remote sites where streets or buildings do not exist, he noted.

After the trucks are loaded, the weight is noted on the Teletype copy and returned to the division terminal operator who retrieves the customer record from the system and adds the actual weights, according to Dell'Antonia.

Product prices, which were automatically included when the computer originally generated the order, are checked by the division terminal operator who can approve the entire order or withhold specific shipments if desired.



A terminal operator at General Portland's Trinity Division retrieves a list of formats from headquarters.

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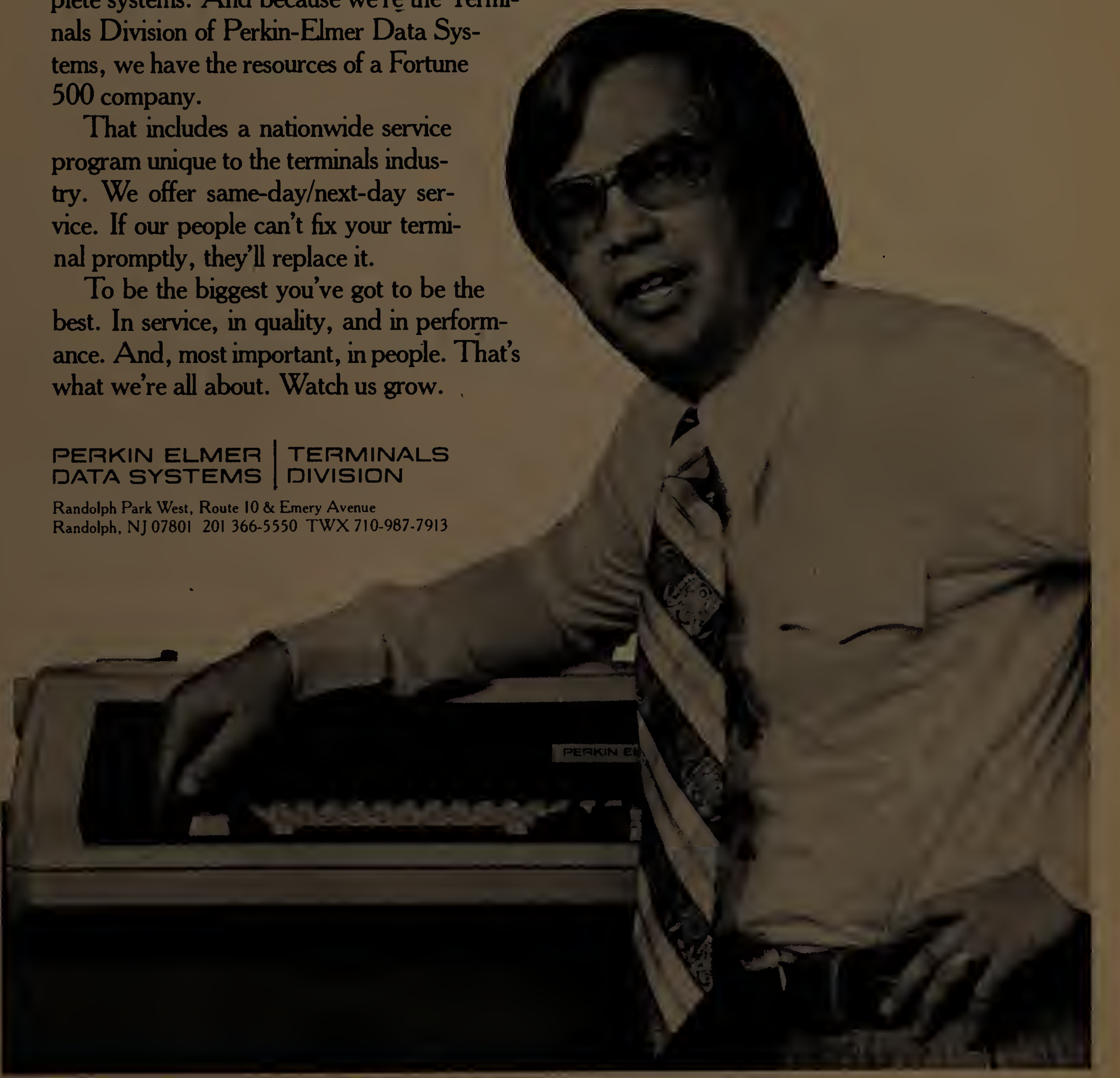

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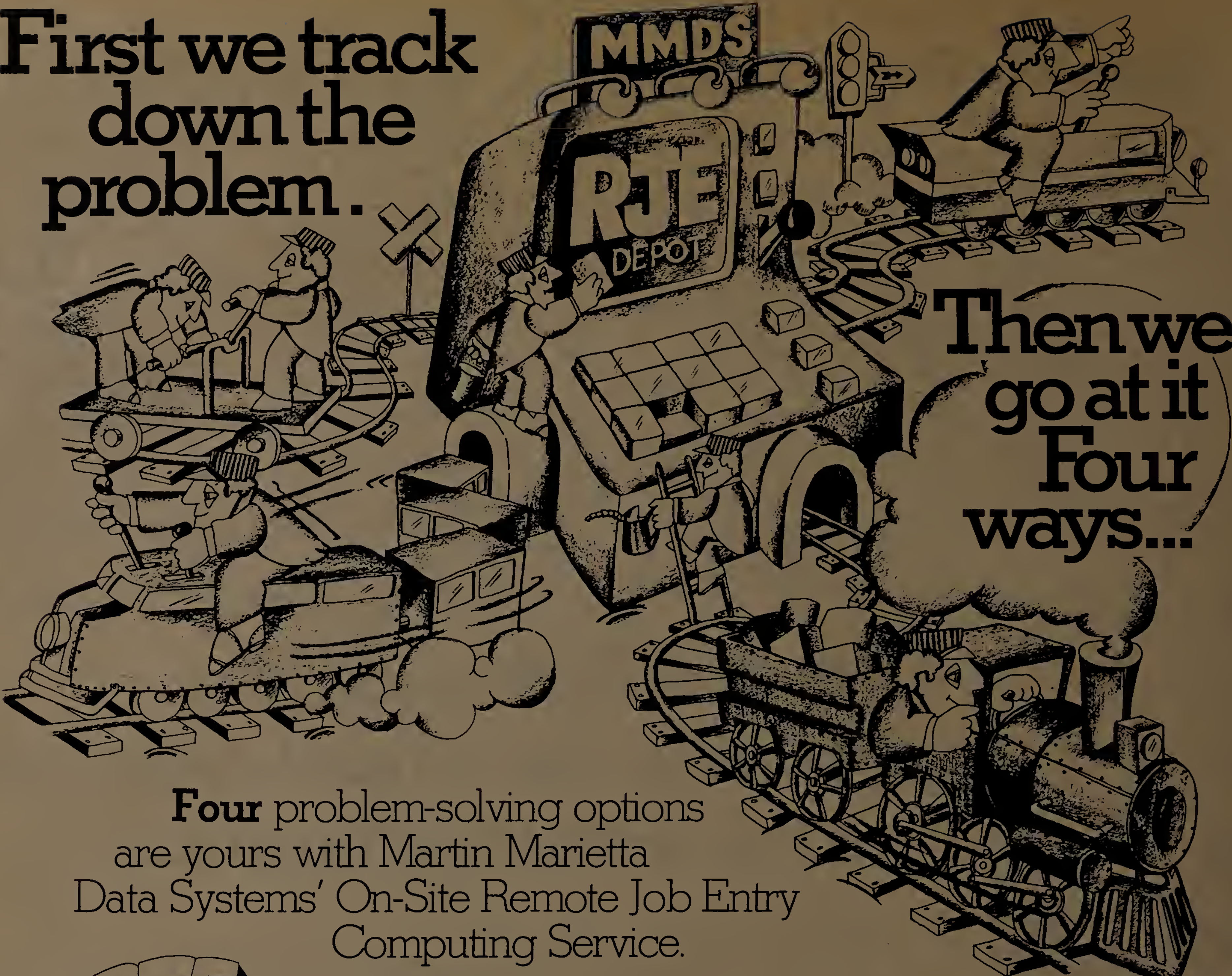

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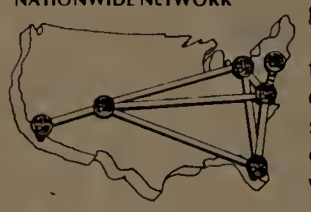
NATIONWIDE NETWORK



On our Nationwide Network (as with the central hardware and software) **economies of scale and utilization apply** offering substantial savings on the cost of communication equipment, associated central software and attendant network management.

eg: Network Management Supplements Capacity

PROBLEM: "We need to service a remote location, but we must carefully evaluate the costs and support required to enhance our existing facilities. What are our options?"

SOLUTION: This massive oil company with twin IBM 370/168 processors (with plenty of computing power left) in a centralized environment is now servicing a remote location through MMDS' **Networked RJE Computing Power.** An imaginative approach from MMDS proved more cost effective than expanding their existing communications network.

By leasing one shift of an existing terminal facility, they received immediate benefits:

Testing	Shakedown of terminals, lines and modems not required.
Reliability	Redundancy (routing/lines) already built into MMDS' Network. Cost prohibitive if on their own.
Timeliness	Conversion, security procedures and systems set-up by MMDS' specialists—per requirements.

Had they expanded their existing network, they would have absorbed 100% of the following costs:

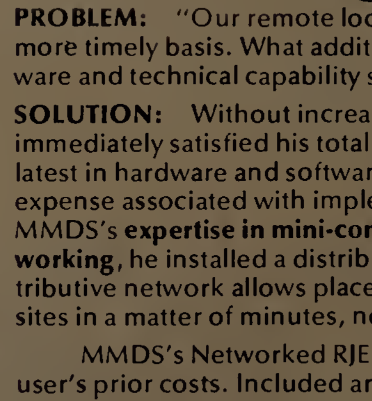
Terminal	$1,886/month
Dedicated Line	1,760/month
Modems	500/month

While spending only a third of the dollars they, more importantly, share in the economies of scale and utilization of the MMDS Network. Elimination of associated network management tasks was more than welcome.

2. RJE . . . as a **Replacement** for an existing facility

Using MMDS's Remote Job Entry Computing Power is **as convenient as running your own machine.** It's cheaper (10%–30% typically) and more versatile. Responsive to either growth or reduction in usage, you always work at 100% utilization: paying only for what is used.

EXAMPLE: RJE CONFIGURATION



On-site card readers, video terminals and printers are handled the same as those on an in-house computer. You test programs and run your systems exactly as on your own machine. **Operational control is unchanged,** except that mainframe tasks are handled by the MMDS "Host" Computing Center. Because of this difference you get: contemporary hardware/software, networked computing power, daily configuration flexibility and free access to MMDS' methodologies and tools.

eg: Manufacturer Replaces 370/135

PROBLEM: "Our remote locations need information distributed on a more timely basis. What additional hardware (local and remote), software and technical capability should we add? What are the costs?"

SOLUTION: Without increasing costs, this medium sized DOS user immediately satisfied his total requirements. He's now utilizing the latest in hardware and software without having incurred the in-house expense associated with implementing such enhancements. Tapping MMDS's **expertise in mini-computers and communications networking**, he installed a distributive data processing network. This distributive network allows placement of critical information at remote sites in a matter of minutes, not days.

MMDS's Networked RJE Computing Power is compared with this user's prior costs. Included are the costs of their distributive network—a Datapoint 2200 and two 1100s. With no major change in overall costs, he's expanded his service and added new systems: he's using our off-the-shelf Modular Application Systems (MAS).

	BEFORE MMOS	WITH MMOS	$ SAVINGS
Hardware*	$19,000/Mo.	$ 1,050/Mo.	$17,950/Mo.
Personnel	10,000	7,300	2,700
Supplies	2,500	2,200	300
Miscellaneous	550	120	430
Processing	-0-	14,000	(14,000)
Communications	-0-	600	(600)
New Hardware**	-0-	3,000	(3,000)
TOTAL	$32,050/Mo.	$28,270/Mo	$ 3,780/Mo

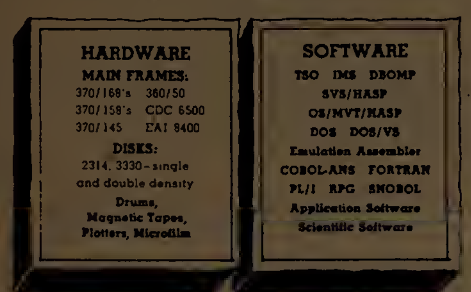
*In-house computer and related unit record equipment
**Terminals and minis

3. RJE . . . as an **Alternative** to acquiring a new computer

Instead of installing a small computer, consider **RJE Terminal Computing as an alternative**. You get your own card reader, printer and video displays; and you **use the terminal as you would your own machine**.

There the similarity ends. You avoid all the constraints of small computers: gaining speed, facilities, capacity, programming languages, off-the-shelf system libraries and flexibility. **You keep your options open**; while escaping the tyranny of machine amortization and the forcing of systems and installation schedules.

CAPABILITIES SNAPSHOT



Above all, from MMDS, you get business systems expertise and data processing discipline. With no cost for our *Systems Development Methodology* and free systems and programming tools, we pass on the *attitudes* and *disciplines* of successful computer/systems usage.

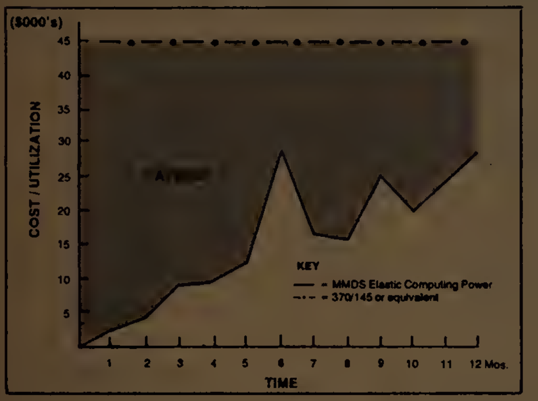
eg State Agency Saves 50% in One Year

Problem: "Budget is not our problem! To implement our new system, we must accurately predict the eventual computer power and utilization requirements . . . as well, growth rate."

Solution: To implement their sophisticated "Road Design System," the agency considered acquisition of its own computer. A 370/145, or equivalent, was their best estimate. At $45K/month, all up cost, this would likely suffice for 2–3 years. At the same time, they recognized:

- in the short term, they'd have an under utilized machine (but continued upgrade would be a headache);
- a missed projection could be an expensive error.

MMDS is now supplying them **"elastic" computing power through an RJE Terminal**. In one year, RJE Computing Power helped them build experience with their system, determine their level of utilization and save over $300K, plus associated opportunity costs.



If the agency should elect to go to an in-house computer, its risks are now minimized.

. . . and the Technology to Support You

Using MMDS' RJE Computing Power gives you facilities, software and flexibility. Running the terminal is almost exactly like running your own machine. But the data processing expertise and disciplines that round out the package provide further payoffs. For example:

FREELY AVAILABLE TOOLS

- Systems Development Methodology (SDM)
- Data Specification Language (HSL)
- Decision Table Processor (Tablemaster)
- Modular Programming Test Harness (Testmaster)
- Off-the-shelf Modular Application Systems (MAS)
- Modular In-House Training System (MITS)

Productivity Aids

With over 50 technical specialists and large-scale equipment, we provide a complex VS, TSO, IMS, CRJE environment. This, with the compliers and utilities we offer, gives you a lot of power. We make sure that the system is fully up-to-date and exercised. On top of that, we make available—at no cost—our proprietary **methodology and tools**.

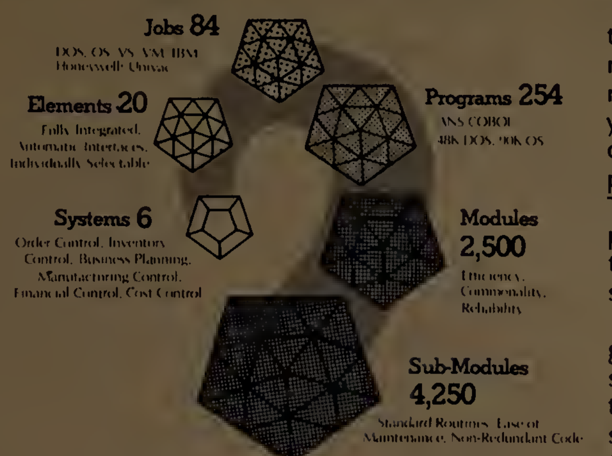
MMDS Conversion Program

Operating as TSO commands, these programs produce a mixed conversion to OS and/or DOS simulation under OS—from DOS or other operating systems. The accompanying chart shows the conversion strategy used by these programs as a function of original program type:

ORIGINAL SYSTEM	METHOD OF CONVERSION	RESULTING OS SYSTEM	PCT. OF JOB AUTOMATICALLY CONVERTIBLE
COBOL DOS/D	MMDS Conversion Programs	OS ANS COBOL	95
ANS/DOS COBOL	MMDS Conversion Programs	OS ANS COBOL	100
RPG I	MMDS Conversion Programs	OS RPG I	100
RPG II DOS SYSTEM 3	DOS Simulator	DOS RPG II Under Simulator	100
DBOMP	DOS Simulator	DOS DBOMP Under Simulator	100
BOMP	DOS Simulator	DOS BOMP Under Simulator	80
FORTRAN—Any	MMDS Conversion Programs	OS FORTRAN	100
DOS ASSEMBLER	MMDS Conversion Programs	OS ASSEMBLER Under Simulator	90
DOS JCL	MMDS Conversion Programs	OS JCL	[illegible]

4. RJE . . . as a **Conduit** for off-the-shelf MAS

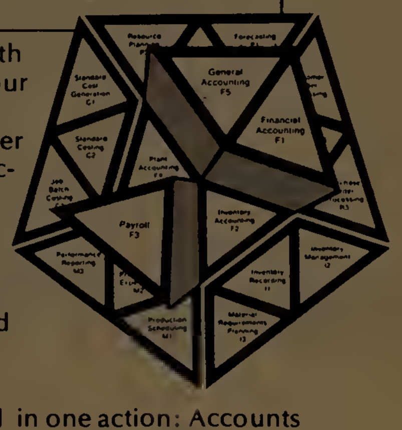
If you're concerned with systems as well as computer power, MAS through our RJE service provides access to over **340,000 lines of code at no cost**—with single supplier dedicated system convenience. You pay only for set-up and customizing you elect to have done.


Jobs 84
DOS, OS, VS, VM, IBM
Honeywell, Univac
Elements 20
Fully Integrated, Automatic Interfaces, Individually Selectable
Programs 254
ANS COBOL
48K DOS, 90K OS
Systems 6
Order Control, Inventory Control, Business Planning, Manufacturing Control, Financial Control, Cost Control
Modules 2,500
Efficiency, Commonality, Reliability
Sub-Modules 4,250
Standard Routines, Ease of Maintenance, Non-Redundant Code

Our "Modular Application Systems" (MAS) are a range of business application modules. They can be run on your own computer, or on our nationwide computer power network (MAS on RJE). The distinctive structuring permits simple tailoring of the systems to your exact specification.

Use a module, a program, a job, a system or a selection of systems. Install them in any sequence, in a standard or customized form, and they'll link together to provide a completely integrated system that **fits you now and as your business needs change.**

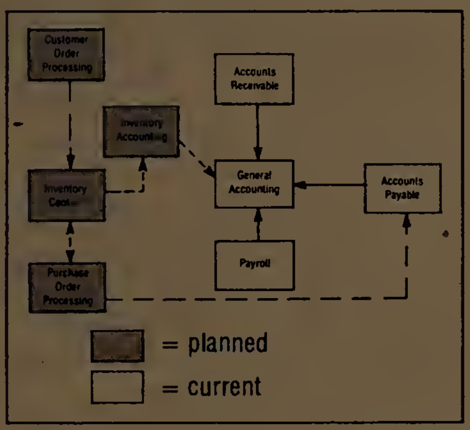
eg MAS on RJE Provides Immediate Financial Control



Problem: "We're projecting a 30% growth rate and need more timely processing of our financial data. We're also planning to add inventory and customer and purchase order processing systems. What's our most effective approach?"

Solution: This high technology division of a major corporation ($8 million sales/200 employees) was relying on a conventional service bureau. They were restricted by couriers, mail service and inflexible software.

With **MAS on RJE**, they implemented in one action: Accounts Payable, Accounts Receivable, General Ledger and Payroll systems. And their general ledger was customized to accommodate Federal Government costing regulations. Their processing load (General Ledger/monthly, Accounts Receivable and Payable/weekly, Payroll/bi-weekly) has increased to over 50 Jobs per month: but costs for processing have reduced from $4–5K/month to 2–3K/month



Assured of complete systems integration, they're now planning for implementation of MAS Inventory and Order Processing systems, at their own pace.

For More Information: We like you to know about our products and services. Just return the coupon, or contact one of our regional managers, and we'll send you our Computing Services Handbook, effectively a manual for using our various RJE services. If it's easier, you might like to contact Dick Nemerson at MMDS Headquarters ((301) 823-1600; 300 East Joppa Road, Baltimore, Md. 21204). If your interest is in off-the-shelf MAS or our Systems and Programming services, we have equivalent handbooks. We look forward to hearing from you.

BALTIMORE: Bob Burns (301) 823-1600
NEW YORK: John Bately (212) 541-4740
BUFFALO: Milt Cooke (716) 634-8210
ORLANDO: Joe Putegnat (305) 855-1050
CLEVELAND: Chris Horrocks (216) 331-7755
CHICAGO: Chuck Erickson (312) 298-1247
DENVER: Norwood Robb (303) 761-3781
LOS ANGELES: Mike Strong (213) 328-0660
LONDON: Neville Cerfontyne 242-1951

Mail to: Dick Nemerson, MMDS Headquarters, 300 East Joppa Road, Baltimore, Maryland 21204

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We Build & Run Systems

Contractor Administers Benefit Fund

CPU Ensures Union Workers Get Everything Due Them

By Esther Surden
Of the CW Staff

PITTSBURGH, Pa. – Accurate recordkeeping is the name of the game at Weaver and Grose, Inc. here because this contract administrator is entrusted with keeping track of the work histories of more than 25,000 union workers in 15 unions.

The company is responsible for administering a union fund whose monies are distributed as benefits to workers employed by more than one concern in the course of a year, according to John Weaver, executive vice-president of the firm. The monies are collected from the various employers.

The mainframe at Weaver and Grose is an IBM 370/125 running under DOS/VS with 256K of memory, four Model 3340 disks, one 3410 tape drive, a 2501 card reader, a 1442 punch and a 1403-N1 printer. It was acquired as an upgrade to the firm's previous 360, Weaver noted.

About 50% of the work done on the system is dedicated to the contract administration function; the remaining half of the system's time is used by financial institutions and the local school districts. "We do our own financial accounting as well," Weaver added.

The firm has "evolved" the software applications over the 10 years of having IBM equipment, Weaver said. "We've written it all ourselves, modified and maintained it. We do use various programming packages such as CICS . . . but the applications programs themselves have all been done by us."

Pleased With Vendor

The firm is very pleased with IBM service and reliability, Weaver reported. "It's the thing that makes us think twice when everybody else comes in and offers to give us comparable equipment cheaper. You don't really want to trade something known that is good for an unknown," he said.

Ten people work in the DP department where the primary application is organizing and storing the data on employer contributions and employee benefits needed to execute health, welfare and pension programs and to meet the strict accounting and reporting requirements of the federal pension reform act.

"The recent flood of pension plan terminations – there were more than 5,000 in 1975 – has raised two major concerns among plan participants today," Weaver said. " 'How secure are our plans?' and 'What benefits will I or my family receive if I quit work, become disabled, retire or die?'

"The system provides us with the data we need to help assure union workers their rights to medical, life insurance, payroll savings, retirement, unemployment and other coverages are protected."

Central Record of Benefits

The system, which is used for more than 50 different union benefit plans, creates and maintains a central record of all benefits each worker has accrued over his lifetime. At the same time, Weaver said, it guards against loss of information – data on contributions, for example – and errors in accounting that could prevent a worker from receiving the benefits to which he is entitled.

Two programs form the core of Weaver & Grose's recordkeeping system. One organizes all information on employers and employees into master files; the other enables administrative clerks to call up these files on IBM 3270 CRT screens to answer inquiries, add new data and print reports.

The system provides a source for the data needed to comply with the Employee Retirement Income Security Act's reporting requirements. These include plan descriptions, filed with the Secretary of Labor; summaries of plan descriptions and plan changes, furnished to participants; and annual reports, supplied to the Internal Revenue Service and the Department of Labor and available to participants.

In addition, Weaver & Grose uses the data for quarterly work history reports, annual statements of workers' eligibility for benefits and summaries of their rights and benefits under each plan.

Standardizes Procedures

"The regulations have increased our paperwork," Weaver said, "and legal liabilities for noncompliance. But we can't let the scope of these regulations get beyond our ability to handle them. This means we must keep our operating procedures above standard."

In the past, he said, there was no practical way to coordinate all variables of information on any one employer or employee. Many workers have "travel" cards in several unions; steamfitters sometimes work as boilermakers, for example, and plumbers as welders when jobs are

(Continued on Page 32)

Holographic-Based System in Prototype

By Don Leavitt
Of the CW Staff

WOODLAND HILLS, Calif. – Developed by TRW, Inc. and now in prototype demonstrations, the Holofile data storage and retrieval system utilizes laser and holographic technology in a microform setting to cut both the cost and the space requirements of massive data bases, according to Holofile Industries, Ltd., which sponsored the development work.

One of the major advantages of the system, however, has nothing to do with space or cost, Holofile said. It revolves instead around an ability to retrieve a full image from only part of a holographic negative – making the system "highly resistant" to the hazards of physical damage, the company claimed.

Holographic recording, a Holofile spokesman explained, is "something like looking through a window. You have a view through the whole window, but you can effectively have the same view, even if half the window is blocked off, by changing your position slightly."

That is the basic difference between the holographic approach and more conventional techniques, he said. The usual DP media reading facilities do not permit this change of position to "see" what's in the undamaged part of a record.

The system apparently is not dependent on any specific mainframe since it will include an RS-232C standard interface. It consists of two basic subsystems, a recorder and a reader.

The reader is the portion now being shown and is expected to be in production next year, the spokesman added.

The recorder was designed to acquire and record electronic digital data in high-density holographic form on standard photographic film; the reader retrieves the holographic data and reconverts it to the original electronic form; according to the presentation that accompanies the current demonstrations.

While the prototype unit is based on the use of microfilm, Holofile expects the production reader to utilize microfiche. With a storage density of "up to 10M bit/sq in.," a 4-in. by 6-in. fiche can store as many as 200M bits of data, the spokesman said.

The recorder is expected to be approximately 19 cubic feet and the reader, a separate unit, about one cubic foot.

On a cost/bit basis, Holofile is expected to be directly comparable to more conventional storage media. An IBM 3330 disk pack, for example, has a cost/bit of 10^{-4}; a 10-in. reel of magnetic tape, 10^{-5}; and Holofile, 10^{-5} to 10^{-6}, according to the company's estimates.

Data reloading time is said to be 10 minutes on the IBM 3330, five minutes on the magnetic tape and .2 minute for Holofile.

Only in "access time" – not further defined in the demonstration documentation – does Holofile compare unfavorably with the disk media. The technology is said to take one second for this function while the 3330 handles the same thing in one-tenth the time. The tape access time was labeled only "long."

Holofile noted the two parts of the system can be used separately. Initially, since the recorder may not be ready when the production readers are, for example, the company expects to produce the

(Continued on Page 38)

Negotiations – Part 2

Prioritized List Aids Strategy

By Joe Auer
Special to Computerworld

Once a user's negotiation objectives have been well defined, the next step is to prioritize them into general categories and subcategories.

The purpose of this step is to keep the negotiation team on track and to establish the relative importance of negotiating points. This prioritized list is *not* for disclosure to the vendor.

Even seemingly minor prioritization can pay off. For example, having completed a rent vs. lease vs. purchase analysis of the acquisition method (even though this process should be done on a component-by-component basis), the "sensitivity" of each ingredient can be evaluated with respect to the total transaction.

You may find the residual value is not nearly as "sensitive" to the entire deal as the unamortized balance is at a given point in the payment stream where some flexibility is really needed.

This article, the second of three in a series about optimizing computer negotiations, deals with ways the negotiating team can preplan its strategy.

This flexibility may not be nearly as sensitive to the total transaction as the investment tax credit, which may not be as sensitive as any number of other things.

(Continued on Page 32)

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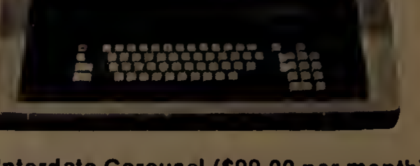

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Best, most efficient terminals, at lowest lease rates available with one call. ADDS 580 and 980 CRT's – among the most reliable. Also: Lear Siegler ADM-1, -2 and -3; Data 100 and Tally line printers; Techtran Data-cassette Storage – and many more.

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Announcing a giant increase in the NOVA line.

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It features a new Memory Management and Protection Unit that lets you do both on-line multitasking and batch operations. Concurrently. For instance, applications that need real-time multi-terminal software and on-going program development.

Plus, the NOVA 3/D features a new, economical, 32K-word MOS memory module. Which is something no other major minimaker has.

All of which makes the NOVA 3/D more NOVA computer, at a lower price, than you've ever seen before.

What's more, the NOVA 3/D also has all the things that have made NOVA the most popular name in minicomputers.

Things like extended NOVA line instructions. Reliable high-speed MOS and economical 16K-word core memory modules.

The single-board CPU design concept Data General pioneered. The same concept that led to our removeable single-board power supply module.

Plus all the other things you've come to expect from a company like Data General.

Things like field-proven, real-time operating systems: our mapped Real-time Disc Operating System, diskette-based Disc Operating System, and our Real-Time Operating System. They're compatible with the entire NOVA line of computers.

Things like high-level FORTRAN IV and FORTRAN 5, as well as easy-to-work-with extended BASIC. Also fully NOVA-line compatible.

Things like the complete and completely-compatible line of Data General peripherals. All you could ever need to put together any system you could ever need. Including 10 to 90 megabyte discs, diskettes, and our new 30 and 60 cps terminal printers.

And when you do business with Data General, you get the kind of total systems support you can only get from a major computer manufacturer. Everything from sales and systems engineering to field service, training, and special systems design.

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Prioritized List Helps Negotiating Team Plan Strataegy

(Continued from Page 30)

By knowing these priorities and how they relate to the overall objectives, you can then effectively stand firm on points that are critical – and negotiate, or leave room for negotiations, on the minor points which aren't as sensitive to meeting your goals and objectives.

Concession Strategy

Generally, don't ever go into negotiations with only the items you hope to win; go in with more items so you can concede a few and still end up with an aggregate number of items that are necessary for ultimate success.

A lot of times, you can use the strategy of taking an item which is low on your prioritized list and blow its relative importance way out of proportion during negotiations; you can then end up eventually conceding that item if the vendor concedes several other items that have a higher priority to you.

The "several other items" are ones you planned to get, are critical to the acquisition process and are also, to you, more important than the one about which you had made such a big deal.

Establishing Parameters

After your objectives are prioritized, establish parameters for each priority. Your negotiating team needs to know how much latitude it has in each area.

At this point, an investigation of equipment and financing alternatives should be undertaken. A thorough study of the alternatives at hand is essential. Equipment and financing alternatives can be illustrated as a three-dimensional decision matrix.

The zero point on the axes is the situation in which a new computer system is rented from a single vendor. It is impossible to do anything but very lightly touch on equipment and financing alternatives now because they are major topics in themselves, but there are numerous points within the dimensions of this three-dimensional decision matrix that could very possibly satisfy your objectives within the prescribed parameters that have been structured, optimize the financial aspects of your acquisition and, at the same time, allow the various flexibilities you desire for the future.

The point is, however, to identify these points within the matrix with an understanding of their relationship to your ultimate goals and how you can be prepared to change negotiating strategies and/or establish "fallback positions."

Once this entire process of requirement determination is completed, obtain the concurrence of your negotiating team members; the team should then formalize a "negotiation position paper" for top management's approval.

The negotiating team must develop the strategies it is going to employ. Two key things to remember in developing strategies are (1) know your opponent and (2) know yourself.

If you have gone through all the steps recommended above, you should know your company's requirements fairly well.

When you investigate the vendor's track record, look not only at its record as a corporation, but also at the track record of the local office with which you will deal. This local office investigation is important in determining how it is doing year-to-date on its goal performance.

Also attempt to ascertain strategies that this vendor and the local office have used in previous, similar situations. On a corporate level, see what the vendor has done with other accounts throughout the nation.

You can determine this through interface with the various members of users' groups. You want to find out things like where the vendor's strategies have succeeded, when people have actually accepted policies it has tried to force on them and which negotiating strategies or marketing attempts have failed.

Then take a step back and evaluate the personnel that are involved, or that you anticipate will be involved, on the other side of the table, paying particular attention to the personal and professional capabilities of the vendor's negotiators and their strengths and weaknesses as just plain people.

Try to do an objective analysis of your own negotiating team's strengths and weaknesses so that during the rehearsal phase of planning you can develop strategies for things like good guy/bad guy, strong guy/weak guy and limited authority strategies.

You must decide whether you are going to overtly, as a team, have the authority to make a decision or whether you are going to use sidestepping and escape ploys to duck issues and say, "We need management approval on that particular item."

Auer is president of International Computer Negotiations, Inc., Winter Park, Fla.

CPU Ensures Workers Get Correct Benefits

(Continued from Page 30)

unavailable in their chosen crafts.

These workers qualify for benefits under a number of different union benefit plans. Further, in trades like construction, workers seldom have a permanent employer; some work for as many as eight contractors in one year.

"It took weeks, sometimes months, to research and update our records manually when new information was received on a worker or employer," Weaver said. "It was often easier to create a new file than to try to tie this data into existing files."

The present system "centralizes our records and makes possible administrative procedures that would have otherwise been too time-consuming, costly or impractical," he added.

Each month, Weaver & Grose receives statements from employers showing union workers on their payrolls during the last pay period, their hours worked and gross pay. Included with this statement is a check covering contributions from the employer toward the workers' benefit plans.

The company first checks Social Security numbers – key to accessing the master files – making sure they are correct on each monthly statement. It computes the contributions toward each worker's benefit funds, union membership dues and industry and apprentice funds based on the union contract with the employer.

These contributions are keyed into master files through the terminals, which update all records.

A NEW IDEA FROM CHARLIE & GEORGE

Take part in MVS performance decisions with Resolve-MVS T.M.

Isn't MVS marvelous?

Its System Resource Manager (SRM) maximizes the use of hardware based on CPU load, I/O load and performance characteristics of each job.

Unfortunately, SRM makes decisions based on the system's needs, not necessarily yours.

The system may be sluggish because it has run out of page frames, auxiliary storage or a job has gone into loop. Up until now there was no way to find the problem and take corrective action.

Or your most time-critical job may be permanently swapped out of memory and you'd never know it. Even if you did know there's nothing you could do about it.

Immediate Feedback

That was before Resolve-MVS. It lets the user inquire about the system's status and gives the response immediately at his system console or TSO station.

Resolve-MVS gives you three types of services to solve right now problems right now. You get information services that highlight problems, action services that help you take action to solve the problems and asynchronous services that give you a warning message that a problem is developing.

It's Resolve Plus

With Resolve-MVS you still have all of the services of Standard Resolve which solve such critical problems as enqueue conflicts, Reserve lockouts, missing I/O operations, paging thrashing and jobs looping or in a wait state.

There has never been anything so powerful to solve your day-to-day operational problems.

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We're so confident you'll like knowing more about your MVS system's operations and in taking part in performance decisions, we're offering Resolve-MVS to you on a 21-day free trial.

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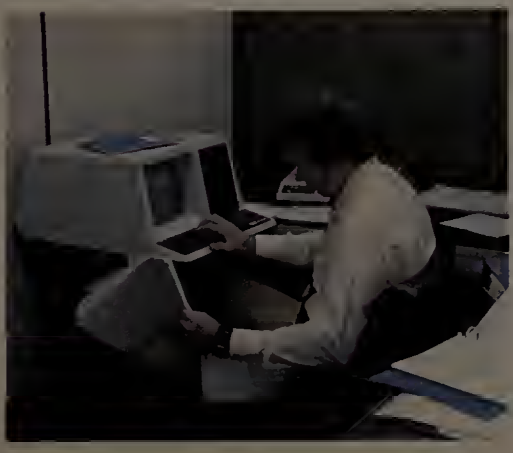

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CD I CW

Altered by Greater User Demands

Data Entry Technology Cited as No Longer Limited

By Toni Wiseman

Of the CW Staff

DENVER – New or advanced data entry technology has been somewhat limited while other aspects of DP improved in performance at phenomenal rates, but this is a thing of the past.

Today's approach to data entry has been permanently altered by advanced technology and greater user demands, Mary Lu Graham, manager of data entry for Supermarkets General Corp. (SGC), recently told attendees at the Super Market Institute's annual DP conference.

In SGC's case, the 1975 conversion from keypunched cards to key-to-disk equipment resulted in a 41.1% reduction in overtime, a 20.9% reduction in DP costs and a 29.9% increase in production, she said.

"Although the initial conversion represented a short period of increased expense, the results that have optimized the environment can be measured in increased levels of efficiency and reduced processing time," Graham told attendees.

The increased level of department performance encompassing improved accuracy, increased records per hour and reduction in DP time is the direct result of the application of equipment capabilities monitored by internally designed control features on the Data 100 Corp. equipment SGC chose, she said.

Increased Productivity

Fewer required keystrokes during the entry process, reduction or limitation of verification, direct automatic selection of format by the operator and the ability to immediately isolate and correct an error are system features that provide each operator with increased productive hours subsequently applied to the keying of more data, she averred.

Successfully operating at SGC, for instance, is an application that supports five concurrent balancing operations, a feature which allows either the automatic generation of totals, or comparison to a predetermined total, she said.

"Successful comparison, realized in 70% of our data batches, eliminates verification and reduces data entry processing time 457.3 hour/mo," Graham noted.

Errors Eliminated

Resident batches of Job Control Language (JCL) are an internal modification of each Job-In, Graham said.

As all possible data types relative to a particular system applications program reside under one corresponding Job-In, transmission errors pertaining to missing data, additional data or incorrectly applied data are eliminated completely, she added.

The search for an identified error, a complicated procedure on cards, now only requires the operator to key by mask a few characters that serve to identify the record. Recovery is automatic and immediate, she said. The error can be corrected or deleted and processing continues.

Although data entry is centralized in physical location, a decentralized environment is simulated because processed data is transmitted directly to the host computer via private line, she said, noting data is transmitted approximately 70 times per day.

After transmission, JCL batches and corresponding data batches remain resident on a temporary data set on the host computer until needed by the applications program.

"Our current operating environment, utilizing the control features supplied by system software and the control features designed to satisfy internal requirements, eliminated the area previously defined as the Input Control Department," she added.

While SGC personnel experienced reservations during the implementation process, they have now found the long-term, permanent benefits have far exceeded the short-term, negative effects, Graham said.

The reduction of overtime from 12.8% in the first quarter of 1975 in a 129 card environment to 7.5% in the first quarter of 1976 with the Data 100 equipment is a reduction of 41.4% as a percentage of salary paid, she asserted.

During 1975, SGC had 34 data entry positions. This was reduced by 5.9% in 1976 to 32, Graham noted. Five input control positions were also eliminated, she added.

The reduction in overtime and the reduction of personnel are major accomplishments and SGC realized a simultaneous increase in volume of processed records from 1.623 to 2.518 million, an increase of 55.2%, Graham stated.

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"We chose the Exide system primarily because of the ease of maintenance and repair. Due to its design, a person with basic electronic knowledge can troubleshoot and repair most failures. Also, we were impressed with the Exide representative's knowledge of their product and his knowledge of UPS Technology. Along with this, their equipment pricing was very competitive."

Robert Watters, Maintenance Engineer, Dallas Federal Savings

"The foundation of our Foreign Currency Trading System for banks is reliable computer performance. To provide that performance we selected Exide for our computer power."

Philip D. Quarles, Vice President, Data Processing, TAFEX Systems Corporation

Key-to-Disk Units Alleviate Firm's Data Entry Bottleneck

By Esther Surden

Of the CW Staff

JERSEY CITY, N.J. – A data entry bottleneck at Shoppers Charge Accounts here has been alleviated with the installation of eight key-to-disk units, according to Don Conlon, vice-president of DP.

The firm services between 200 and 300 small retailers in the metropolitan New York area, evaluating and checking the credit status of the retailer's customers and advancing credit for the store. The company then bills the customer in the name of the retailer, Conlon said.

The firm handles over 100,000 statements each month, originating from sales slips handed in by the merchants involved, Conlon noted.

Prior to going with CMC-3 key-to-disk systems from the CMC Division of Pertec Computer Corp. the company had IBM 129 data recorders. And all the information had to be punched onto cards from the original documents and no controls over garbled numbers or lost slips were available, he added.

Now the company receives the documents from the store imprinted with the account number that appears on the charge slip and microfilms the documents. The data is entered directly onto disks, thus creating a permanent record, Conlon explained.

The data is batched to a 64K IBM 360/30 at Shoppers twice a day, Conlon added.

The units have eliminated the need for about 150,000 IBM cards per month and have freed about 30 hr/mo of CPU time, he noted.

Newfound Ability

Among the benefits cited by Conlon is the newfound ability to check for lost items.

"When the documents come in from the store we microfilm them and give them a sequence number. That means they cannot be lost. Then we keypunch in the reference number and every month print a missing reference number report.

"We could never check it out before," Conlon continued, "because we just punched the card into the computer."

Prototype Based On Holographics

(Continued from Page 30)

fiche for users.

The basic reader can be interfaced to peripheral devices such as CRTs, line printers and electronic note pads; the data stored on the fiche can be accessed by multiple concurrent users. Since it has a read-only capability, the unit has no need for the lockouts required to prevent concurrent updates, the spokesman said.

The separation of recording and retrieving capabilities impacts the applications for which the Holofile approach may be best suited, the company acknowledged, pointing to massive and generally very stable data bases as ideal.

The company estimated the reader itself may be in the $250 to $500 range. The recorder is expected to cost between $100,000 and $200,000, the Holofile spokesman added from Suite 243, 21243 Ventura Blvd., Woodland Hills, Calif. 91364.

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When the lawyers for one of your suppliers sit down to draft a contract for you to sign, you can bet they don't have your best interests in mind. But you don't have to be defenseless. Given a basic knowledge of the unique problems of contracting in the computer industry, you can make sure your contracts are working to get you what you're paying for — not protecting the other guy from his mistakes. And that's just what this seminar can do for you. We will even review your current contracts — right in class.

The Course Work

Roy Freed, the seminar leader, will review all types of contracts impacting computer use, including:

- the lease or purchase of systems — bundled or unbundled
- the purchase of time-sharing, data processing services and consultation
- the use of facilities management
- and others

In addition to a basic review of the laws regulating DP contracting and taxation, you'll learn how to apply the legal rules in a positive way to gain advantage for yourself. And *bring your own contracts, because they will be an important part of the course work.* All registrants are invited to bring their contract forms to the seminar for discussion and review to the extent feasible.

In the workshops you'll gain practical experience with the techniques under study. You'll learn, for example, how to recognize opportunities to negotiate; how to establish performance goals and conditions while you can still do something about it; how to avoid costly litigation and resolve disputes; and how to achieve significant tax savings through the proper structuring and wording of contracts. Plus, you'll gain valuable experience with techniques for handling any transaction. Overall, you'll have an excellent chance to learn a great deal in a short time, as many of our earlier participants have found:

"This seminar will provide me with an ability to evaluate future contracts and renewal contracts for refinement purposes. This course has been excellent."
F. Ford, Entrex, Burlington, Mass.

"I considered this to be a very good fundamental review of basic problems associated with EDP contracting."
J.M. Aubry, Canadian Government

"This was an exceptionally well organized seminar. The material presented was significant and useful. This seminar would be of great practical value to someone without computer contracting experience as well as serving as a useful outlet and review for those with more background and experience."
William C. Prinn, Director, Advanced Planning
Chessie System, Baltimore, Md.

"I had no idea that we would have the opportunity to communicate so closely on an informal basis. That, combined with your excellent preparation, made this experience the most rewarding seminar experience I've had. I commend you for what I regard as a most worthwhile seminar, and thank you for your genuine interest in communicating with, and not merely to the participants."
SV, Attorney, Worcester, Mass.

"The appropriateness of this seminar is extremely important. This area of the Computer Science field has generally received little or no attention from user, vendor or the legal professions."
D.J. Connelly, Development & Control Manager
Norton Company, Worcester, Mass.

Roy N. Freed is the Seminar Leader

Roy N. Freed is internationally known for his acuity and expertise in this field, and he will personally direct the entire seminar. A graduate of Yale Law School, Roy has served as inside counsel for a major manufacturer of digital computers, and is currently engaged in private corporate practice in greater Boston with the firm of Pollock, O'Connor and Jacobs. He teaches at Boston University Law School, and has written many articles on this subject, including "Computer Fraud, a Management Trap" (Business Horizons), and "Get The Computer System You Want" (Harvard Business Review). He is the author of the book, *Computers and Law — a Reference Work,* now in its fourth edition, and he also edited the complete, extensive course materials used in this seminar.

Charges and Enrollment

The charge for the entire 2½ day seminar, including continental breakfasts, luncheons, and all course materials is $325 per registrant. Additional registrants from the same company are charged only $275. This does not include hotel rooms, if necessary, but we have reserved space at the seminar hotels for attendees who wish them.

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Mini Bits

NCR 499 Printer Option Has 130 Char./Sec Speed

DAYTON, Ohio – NCR Corp. has enhanced its general-purpose NCR 499 minicomputer with the addition of an optional printer.

The printer, which can be installed in the field, increases the 499's printing speed from 75- to 130 char./sec.

The unit costs $1,500 from NCR in Dayton, Ohio 45479.

Cards for IBM 3 in Color

HORSHAM, Pa. – IBM 3 users can obtain a Rainbow Pack containing 20,000 cards in five different colors from Globe Ticket Co.

The pack consists of 4,000 cards each color – red, green, salmon, yellow and blue – printed in red ink and they can be ordered with either an upper right or upper left corner cut.

The pack costs $1.05 per 1,000 cards plus a $5 "put up" charge, the firm said. Quantity discounts are available from Globe at 680 Blair Mill Road, Horshan, Pa. 19044.

Monolithic Add-On for PDP-11

ENGLEWOOD, Colo. – Monolithic Systems Corp. has cut the price of its Digital Equipment Corp. PDP-11-compatible Monostore VII add-on memory system.

The price is now $795 for 4K by 16-bit memory, $1,075 for an 8K by 16-bit memory and $1,350 for a 12K by 16-bit system, the firm said.

Monolithic is located at 14 Inverness Drive East, Englewood, Colo. 80110.

Scientific Turnkey Announced

FAIRFAX, Va. – A turnkey minicomputer system designed for scientific and process control users is available from Nine Associates, Inc.

Based on the Honeywell Level 6/36, the system features a high-speed line printer outputting at 2,100 line/min.

The mini can be supplied with an analog-to-digital data acquisition front end, a high-speed on-line or off-line plotting system and a CRT or 60 char./sec keyboard send/receive teleprinter, the firm said.

Using a dual flexible disk system, the mini is oriented toward distributed processing applications, plotting or mapping and surveying types of uses.

A typical configuration includes the 6/36 with 16K of memory, dual diskette, CRT and a 2,400 line/min printer and costs $19,000 including software.

Nine Associates is at 10680 Main St., Fairfax, Va. 22030.

With Multitasking CPU

Basic/Four Extends Line at the High End

By Esther Surden
Of the CW Staff

IRVINE, Calif. – With the introduction of the System 700, Basic/Four Corp. has extended its line of small business systems at the high end.

The transaction-oriented system features interactive and multitasking operations and can support up to 16 CRTs, the firm said.

In the range of the low end of the IBM 3 or the Burroughs B700, the System 700's price starts at $115,000. The system features bisynchronous communications capabilities to allow it to communicate with IBM host mainframes, a spokesman noted.

The minimum configuration includes the CPU with 64K bytes of memory, four CRTs, a 300 line/min printer and two 50M-byte disk drives. It can handle up to 16 channels of full-duplex communications at 1,800 bit/sec over standard telephone lines, he added.

Current Basic/Four users must "trade in" CPUs to upgrade to the System 700; peripherals and software programs, however, are compatible, he said, adding some disk files may have to be "placed differently" when transferred to the system.

The CPU can address up to 128K of memory, Basic/Four said. The 600-nsec semiconductor memory is expandable in 8K increments with parity check, the firm added.

The CPU has an eight-page firmware set to allow it to contain an increased number of instructions; the CPU formerly used on Basic/Four systems had a five-page firmware set.

Up to 400M bytes of disk storage using removable disk packs can be accommodated by the system; the disk storage subsystem is microprocessor-controlled, the spokesman continued.

The System 700 features an enhanced operating system which takes up to 24K of memory. The Tri-State Language Processor for the 700, which Basic/Four said performs "preprocessing on the source code so the processor executes faster," is another feature.

"The operating system will permit numeric packing of any files before they are written to disk, resulting in a 40% reduction in the space required to store this data," the spokesman claimed.

The system uses Business Basic II programs and utilizes the Exception Analysis System for report generation/inquiry for exception reporting.

The unit also includes software spooling for more efficient line printer operations; up to two printers can be attached to the System 700, he noted.

The System 700 will be available in March; Basic/Four can be reached at P.O. Box C19550, Irvine, Calif. 92703.

System Helps School Conduct Summer Music Fest, Classes

By a CW Staff Writer

ASPEN, Colo. – Music Associates of Aspen has been using a minicomputer to handle a nine-week stretch of summer music festivities and classes during which payroll, student and artists files explode in volume.

Although using a mini mainly for peak operations is often said to be a wasteful proposition, the school had virtually no alternative, according to controller Michael Rohan.

"Our systems are so specialized we were better off programming in Basic and doing it ourselves; and we really needed an on-line system," he said. The nearest "real service bureau is about 200 miles away and telephone line costs would have been prohibitive," he noted.

The Data General Corp. (DG) Nova chosen by the school is a 3/12 with 32K of MOS memory, 10M bytes of disk, a CRT console and a 300 line/min daisy wheel-type printer.

The system hardware, including the educational discount the school received, cost $25,000. This could be easily justified because the school was paying $300/mo for an IBM magnetic card unit, which has been eliminated since the purchase, Rohan said.

Summer Events

During the summer, he explained, the institution sponsors the Aspen Music Festival and offers courses that are accepted for credit at the University of Colorado.

Payroll increases from about 10 to 300 people. Artists are scheduled to appear and teachers are paid according to the number of lessons they give each student, he noted.

"About 200 artists appear in various time periods and we have to pay them on a fixed schedule. Their schedules are all set up on the CPU and the accounting department can look up all the necessary information on them as well as information on school vendors and school employees," Rohan said.

Another application of the system entails producing fund raising letters which are sent to prospective donors. The fund raising file is on the system and the letters can be configured in any way necessary, Rohan noted. The printer is of letter

(Continued on Page 42)

DG Announces Scientific Version Of Top-of-Line Eclipse C/330

SOUTHBORO, Mass. – Data General Corp. (DG) has announced the configuration of a top-of-the-line Eclipse minicomputer for scientific users.

The Eclipse S/230 includes hardware features already introduced with the Eclipse C/330 [CW, Sept. 6] which include:

- A 32K-byte memory module which doubles the density of previously available 16K core modules and features an 800 nsec read cycle time. The 64K-byte semiconductor modules have a 500 nsec cycle time.
- Main memory expandable to 512K bytes.
- Hardware mapping and protection that is said to allow concurrent programs to run in main memory with a look-ahead algorithm that increases processor speed.
- Expanded data channel address space which reportedly permits users to increase the number of peripherals that can be attached to the system. Data channel address space is now 256K bytes compared with 64K bytes for the previous data channel.

The system operates under DG's RTDOS or RTOS software and uses Fortran IV, Fortran 5, Extended Basic and Algol.

Application support software includes RJE80 for remote job entry, the Communications Access Manager and the Sensor Access Manager for sensor-based applications, the firm noted.

The S/230 with 64K bytes of core costs $19,000; with 512K bytes of semiconductor memory with error correction and the DCU/50 data control unit, the system is priced at $83,500; and with 256K bytes of cor, magnetic tape drive, 92M bytes of disk, CRT, Dasher 30 char./sec printer terminal and a 300 line/min printer, the S/230 costs $133,100, DG noted from Route 9, Southboro, Mass. 01772.

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CINCINNATI MILACRON

Micros Seen Giving Minis a Run for Users' Money

By Toni Wiseman
Of the CW Staff

LOS ANGELES – While minicomputer vs. microprocessor comparisons were relatively easy to make in the past, technological advances have changed the name of the game, Ed Zander of Data General Corp. told a recent conference here.

"Just a few years ago, microprocessors were commodity-type devices that could offer the OEM low-scale computing performance at low cost," but their processing power, memory and I/O capabilities were limited, he said.

In addition, their general incompatibility with other computers made them suitable only for well-defined "dead-end" applications that would not require significant system changes, he stated.

Today, however, a new generation of microprocessor-based board computers provide 8- and 16-bit architecture and more sophisticated memory and I/O schemes along with software and other support features which were previously limited to their "large ancestors," he said.

"They still can't match the processing power and functionality of modern minis, but due to their attractive prices they're carving out some new markets of demanding applications that cannot justify the higher prices of full-fledged minicomputers," Zander said.

Eight-bit microcomputers on a board are typically suited to data-handling applications that do not demand much computational or high-speed I/O capability or more than 4,000 or 8,000 word memories, he noted.

Sixteen-bit microcomputers, on the other hand, boast higher computational power and bit-efficient 16-bit instructions, he said. They are therefore suited to high-computational, real-time applications in instrumentation, process control, military communications and navigation, high-level communications and graphic arts.

"These machines can handle large main memories, usually up to 32K 16-bit words, and multiple peripherals and are supported by real-time operating systems and high level compilers; they're best suited to applications with minicomputer-like requirements," he stated.

Mini Still 'Heavyweight'

But, while 8- and 16-bit microcomputers have made great strides, the minicomputer is still the "heavyweight" in terms of processing speed, memory, peripheral variety and capacity, Zander said.

On the debit side, minis cost more than microcomputers on a board and their packaging flexibility is limited by their larger size, he noted.

"The microcomputer is a double-edged sword, offering higher potential for the right application along with the greater risk of faulty system design or implementation," Zander said.

The OEM must have a clear understanding of the specification differences between the two technologies and how they apply to his application before he can even begin to face the realities of designing systems based on micros or minis, he added.

Generally, minis are easier to implement because they come packaged with CPU, memories, I/O boards, peripherals and software – all pretested in system running conditions, he stated.

A microcomputer on a board typically must be configured into a working system by the OEM itself, a situation which can be devastating if the OEM introduces nonstandard parts into its "aspiring" microcomputer system, Zander said.

Compatibility is a key issue for the OEM, he said, since hardware and software compatibility assures the OEM its design investments won't go to waste when it adds to or changes its products.

"Now that higher performing microcomputers are creating new system-scale applications, compatibility has become critical to their long-term success in large systems as well," Zander said.

Hardware and software compatibility begin with the processor's instruction set, which should contain all the system instructions for running the CPU, memory and I/O functions the OEM will need, he said.

"System software for a microcomputer should be modular to make most efficient use of memory. This means the OEM should be able to program as much of the operating system as it needs and no more," he asserted.

Applications software can typically be brought on-line faster with minis than micros because of the minis' full peripheral support, sophisticated operating systems and dynamic debug facilities, he noted.

Implementation on micros usually involves emulators and cross-assemblers used in conjunction with time-sharing systems or minicomputer-based development systems, he added.

"Whether selecting minicomputers or board-level microcomputers, the final issue for the OEM is system compatibility with other standard products," Zander stated.

"If the vendor can supply necessary hardware, peripherals, additional memory, operating and development system software and a high-level compiler, the OEM will be able to put more of its design time into the end-product features, where its expertise better applies.

"And if the vendor can supply chip-level microcomputers as well as compatible minicomputers, all the better."

Mini Helps School With Summer Fest

(Continued from Page 39)

quality for this application, he said.

Accounts receivable and student accounts receivable are also on the mini. Terminals in both the institute's office in downtown Aspen and the home office are tied to the system through dedicated 1,200 bit/sec lines, according to Rohan. The CRTs are used for data entry in the accounting and billing applications, he added.

The applications software for the system was designed by Data Management Associates, a Colorado Springs software house. The school may negotiate with another local firm for software and consulting in the future, Rohan said.

"We are talking about expanding the system and putting on a winter user," but that move would be optional since "we have justified the cost based on the summer usage alone," he added.

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Upkeep Weak Area

Mini Service Not Too Good

By Jon David

Special to Computerworld

Minicomputer Exchange

Minicomputer technology has advanced to the point where minicomputers are one of the most reliable pieces of equipment available. Unfortunately, a minicomputer system contains much more than just a minicomputer and users often find that if a printer goes down, a disk goes down or whatever, the entire system is effectively unusable. When you combine the reliability figures, the entire system has a much lower reliability than its components.

Most end users look beyond the capabilities of an operational computer system and try to determine what will happen when the system goes down. Manufacturers' representatives normally respond to this with impressive reliability figures, normally expressed in mean time between failure hours, days or processing units.

Regardless of the reliability of a computer system, it surely will go down from time to time. When it goes down it should be brought up as quickly as possible, and this is a question of maintainability rather than reliability.

Minicomputer maintenance is probably the weakest area of the entire minicomputer field. There are, of course, many reasons for this to be true.

At one time, people did not buy a computer, they bought a Univac. These days we find many companies no longer have computer rooms, but rather have IBM rooms. Companies such as Univac and IBM have tended to introduce significant hardware changes fairly slowly.

What this means is the man trained on the mainframe hardware of today will be servicing virtually the same hardware a few years from now.

Not so in the minicomputer field. Although about a dozen companies can justifiably claim to make large computers, nearly a hundred companies can claim to make minis.

There are significant differences, from an engineering point of view, between minicomputers; to develop or maintain a competitive advantage, minicomputer manufacturers regularly introduce new products with new engineering characteristics. We therefore have a situation where a maintenance person gets familiar with a piece of equipment just in time to see it discontinued.

Where do all the minicomputer companies come from? They tend to come from other minicomputer companies. When they form, they try to take with them the best representatives of their former companies. Obviously, this includes maintenance people. Similarly, as companies grow, they expand their serv-

(Continued on Page 44)

Readers are urged to reply to this or any other Minicomputer Exchange article. This is your column, a chance for you to exchange views on the various topics confronting the minicomputer user, a chance to tell the vendors what you are thinking and to let your fellow mini users know about pitfalls or new techniques in this area. Letters or manuscripts should be addressed to Minicomputer Exchange, Computerworld, 797 Washington St., Newton, Mass. 02160. Double space please.

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Mini Service Not Too Good; Maintenance Needs Improvement

(Continued from Page 43)

ice forces and normally do this by hiring the best they can from competitors.

Now, just as the best MG repairman might take a while to learn the characteristics of a Mercedes or a Cadillac, so do even the better computer service representatives take a while to learn new product lines. The minicomputer industry suffers from an environment with considerable maintenance force turnover and this hurts customer service.

Minicomputer manufacturers sell large quantities of equipment to OEMs. Some OEMs just buy the computer and use peripherals other than those obtained from the manufacturer. The manufacturer normally does not maintain such a system.

The OEM will usually service the system himself or arrange with a third party service company to service the system. In either case, since service is not done on a contract basis with the manufacturer, requests to the manufacturer for replacement parts normally get lowest priority, so even the most trivial repair may require a system to be down for an extended period.

Manufacturers' service organizations have their problems, too, and these problems are often not palatable to an end user.

All manufacturers train their personnel, but there is a tremendous difference between a merely trained service representative and one experienced with the particular systems and equipment being serviced. Experienced personnel tend to be in the minority because of both great personnel turnover and the introduction of new equipment.

Another problem is parts. Even if a manufacturer has a service department in your area, he may not have a parts depot; if he has a parts depot near you, there is no guarantee that he will have the part you need.

Reviewing the minicomputer service station, we find it is not too good. Although proven systems and equipment do not go down overly frequently, they do go down. The maintenance representative who shows up to service your equipment is often far less than expert with it. If you need a part, you frequently have to wait at least a day or two to get it.

Can you afford this? You have to. If a particular vendor guarantees he has a super special maintenance service package for end users, the world's most qualified service staff and largest parts depot or whatever, you can believe him. You can also believe the moon is made of green cheese. Expect to have service problems and plan for them.

The only way to minimize the likelihood you will be hurt by minicomputer service is to design your application and operational flow to guard against your system being down for a period of at least two days.

This may mean you must generate extensive printed reports for no other reason than their use, should the system go down; that you must store your data in an industry-compatible format on an industry-compatible device (such as a magnetic tape) so you may have key functions performed at another installation; that you must program in a "portable" higher level language so you may take your programs to another installation, and the like.

If your situation is sufficiently critical, you may have to buy a complete second system to act as backup for the first, should it go down.

Plan for it to be down, and you will be ready when it is down; assume it won't go down and you may find yourself in very, very serious trouble.

David is president of Minicomputer Industry National Interchange (Mini), a professional society treating minicomputers, microcomputers and associated technological techniques, and is also president of Systems RDI.

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CI Notes

HP's Micro Its Own?

PALO ALTO, Calif. – Could it be that the heart of the new but as yet unnamed "microprocessor-based" CPU of the Hewlett-Packard Co. (HP) 1000 system is the product of its semiconductor laboratories?

An HP spokesman answered the question with a "no comment."

Referred to internally as the XE processor, the unit is expected to be featured in a separate product announcement later this fall, industry sources said.

NCR Keeping Paper Division

DAYTON, Ohio – NCR Corp. has decided against selling its Appleton Papers Division and discontinued discussion with interested parties.

"We have determined that the corporation's interests will best be served by retaining this paper business, which complements the company's production of computer and other electronic business equipment," NCR chairman William Anderson said.

The decision was the result of a comprehensive review of the division's markets, operations and prospects, he added.

Univac to Expand Personnel

BRISTOL, Tenn. – Univac plans to add 400 employees to its payroll here, including more than 100 technical, professional and management personnel.

Initial projections indicate the increase in employees will increase the output of equipment at this facility by $30 million annually, Univac said.

The plant's primary product is the Univac 90/30 system.

CDC Forms Special Group

MINNEAPOLIS – Control Data Corp. plans to form a special systems engineering department in its Washington, D.C, facility to design, develop and test document-handling products.

The department will initially be staffed by a group from CDC's Rockville, Md., plant, which is scheduled to be shut down.

The Rockville product line of optical character recognition (OCR) equipment is being transferred to a Roseville, Minn., plant., according to the firm.

Views on Leasing – Part 2

Lessors 360 Buys a 'Millstone': IBM

By Molly Upton
Of the CW Staff

NEW YORK – IBM's Market Evaluation Department felt lessors' naivete about the impact of the New Series (NS) line and their massive purchases of 360s in 1968 spelled trouble for the industry in the future, according to a 1969 report recently filed as evidence by the Justice Department in the U.S. vs. IBM antitrust trial.

When the department looked at the leasing industry in 1969, it reiterated its previous assessment that lessors would be adversely impacted by the forthcoming NS, or 370, line [CW, Sept. 27].

It found diversification efforts by lessors had not had a large impact. Of nine major companies, only two obtained less than 50% of their revenues from 360 leases and only three were less than 70% dependent on computer leasing, the report told management.

In fact, the leasing industry's 360 purchases in 1968 exceeded even IBM's projections. While IBM had expected lessors to purchase about $600 million in gear, 360 purchases topped $1 billion and the leasing industry's total 360 investment reached $1.5 billion the report said.

"The level of [lessors'] purchases in 1968 might turn out to be the proverbial 'millstone,' " the report observed.

"In our view, the pace has been too fast. The overall leasing company picture is far from good because a very large percentage of the industry's rather young inventory is subject to strong competitive pressures – to impact!" the department said.

For example, 40% of lessors' total investment was in CPUs, "all subject to quick/easy displacement if the 'next generation' is compatible – as we understand IBM's NS will be," the group pointed out.

More than $300 million worth of the lessors' investment was in 2400 tapes and 2311 disks, "both highly vulnerable to impact from 2420- and 2314-type devices," the report said.

By 1969, lessors owned 30% to 40% of all 360s being rented by customers, and IBM didn't see much chance that world markets would open up for used machines.

The analysis saw after-tax earnings of the leasing industry turning abruptly downward in 1971 and falling into a loss position in 1973.

It predicted the pattern would be $106 million in 1970, $69 million in 1971 and $52 million in 1972.

Given the general discount level by lessors of 15% in 1969, IBM said it conservatively estimated this would be 20% in 1971, 25% in 1972 and 40% in 1973.

The average date of purchase of the leasing industry's 360s was August 1968. Using this date, IBM observed that in mid-1973, nine years after announcement of the 360, when it "in all likelihood will be out of production, the industry's inventory will be only five years old – half the life upon which leasing company

(Continued on Page 50)

360	To NS	Price Performance Improvement Of NS Over 360*	Required 360 Price Reduction**
Model 30	NSO	2.0	50%
	NS1	1.7	40%
Model 40	NS1	1.6 to 1.7	40%
Model 50	NS2	1.5 to 2.0	35% to 50%
	NS2M	1.7 to 2.4	40% to 60%
Model 65	553	1.3 to 2.3	25% to 55%

*Source: IBM Systems Development Division presentation, March 1969.
**To match NS price/performance. Current discount level is approximately 15%.

IBM, in its 1969 market report, outlined the price reductions it thought lessors would have to offer in order to make 360s' price/performance competitive with the forthcoming NS, or 370, series.

Promise Plus Problems Expected For U.S. Suppliers in Europe

By Don Leavitt
Of the CW Staff

LONDON – There is a substantial and growing market for DP products and services in Europe, but U.S. and Canadian suppliers interested in this market area must be aware of potential problems as well, according to *The Continent of Opportunity – Europe 76/77*, published here recently.

Prepared by Expertise International, a local consulting group, the booklet noted the 16 countries of Western Europe have a population 50% larger than the U.S. with a gross domestic product 6% to 7% larger.

In computer terms, Europe is less advanced than North America, but is growing at a faster rate, the report said. Computer services – including software products – are growing even more rapidly than the hardware sectors, the consultants continued, adding "currently 33% of the total market services are expected to account for more than 40% of a much larger market in 1980."

But U.S. and Canadian firms "would be wrong to view Europe simply as a convenient extension of the North American home market," the authors warned. There are "substantial differences" between Europe and North America "and, for that matter, between different countries within Europe," they said.

Market Needs Vary

"Furthermore, market needs and acceptances vary – a product that sells well in Dallas may be totally inappropriate to the requirements of users in Dijon, Dusseldorf or Durham," they went on before turning optimistic with the thought that "a product with a very unexciting home sales record may turn out to be a real moneyspinner east of the Atlantic."

Exchange rates fluctuate and confuse the picture, yet "very broadly speaking, hardware prices in Europe tend to be related to U.S. list prices, but charges for services depend predominantly upon local labor costs," the booklet noted.

Further, "the attainable financial ratios

(Continued on Page 47)

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In Preliminary Report

ADTS Outlines Savings Plan for U.S. Use of DP Gear

By Molly Upton
Of the CW Staff

WASHINGTON, D.C. – The Automated Data and Telecommunications Service's (ADTS) plans to promote savings in the government's use of DP gear include increased use of plug-to-plug contracts, third-party contracts, reduced rental costs through leaseback contracts and exchange/scale restrictions.

In a preliminary report to the Office of Management and Budget regarding the Presidential Management Improvement Initiatives [CW, Sept. 13], the ADTS unit of the General Services Administration (GSA) said it intends to contact agencies to have them review their own situations on these aspects.

It will also require agencies to publicize in advance their procurement plans in the *Commerce Business Daily.*

The ADTS said estimates indicate the government lost $6 million in fiscal 1976 because present regulations allow an agency to exchange or sell automatic data processing (ADP) equipment to commercial firms even though there is identical equipment being leased by another agency.

The ADTS is preparing a temporary regulation to restrict an agency's use of exchange/sale transactions in order to preclude the potential losses.

In its drive to increase the use of existing GSA requirements contracts for plug-to-plug-compatible gear as replacements, where possible, for equipment rented under ADP schedules, the ADTS plans to request agencies to review their rental plans.

Also, it is reviewing the management information system printout, which it said lists about 560 pieces of equipment representing over $723,000 in monthly rentals.

From this it will determine a priority schedule based on release date and quantities to contact agencies to investigate possible replacements.

The ADTS indicated new requirements contracts for eligible equipment will be established if warranted.

"Also, we shall intensify our review of all agency procurements to ensure that there are no undue restrictions on the acquisition of plug-to-plug-compatible equipment," the report said.

Regarding increasing the use of third-party ADP contracts, the ADTS will request agencies to review equipment under ADP schedules with the objective of replacement with more economical equipment from third-party vendors, the report explained.

It plans to intensify its review of all agency procurement to ensure there are no "undue restrictions" inhibiting third-party participation.

Europe: Promise and Problem

(Continued from Page 46)

such as return on capital employed, gross profit margin on sales or price/earnings, will vary from country to country" and "it is unrealistic to attempt to impose global corporate standards," it continued.

A European operation can neither be inaugurated nor effectively managed by remote local at a distance of 3,000 miles or more, the consultants added before suggesting "local expert advice and assistance are essential if mistakes and disappointments are to be avoided."

Smaller Market Sector

Getting down to details, the booklet noted the government market sector in Europe is a much smaller proportion of the total market than is the "public sector/defense/space sector" in the U.S. Governments in some cases afford some measure of preference to their own national concerns, the report said.

"Not surprisingly . . . Europe has not developed any indigenous manufacturers or service companies of a size comparable to IBM, Digital Equipment Corp. or Computer Sciences Corp.," the report continued. Almost all the big suppliers are already owned by U.S. or European major corporations or governments, it noted.

At the middle and lower end of the company-size spectrum, however, "there are some very interesting independents." Because of financing problems, for example, there are, "from time to time, some excellent opportunities for a North American company to buy into an established European operation on attractive terms," the report said.

Potential Problem Areas

Potential problems fall into two categories, the report said. The first involves problems with which the management has had previous experience and which are usually common regardless of location.

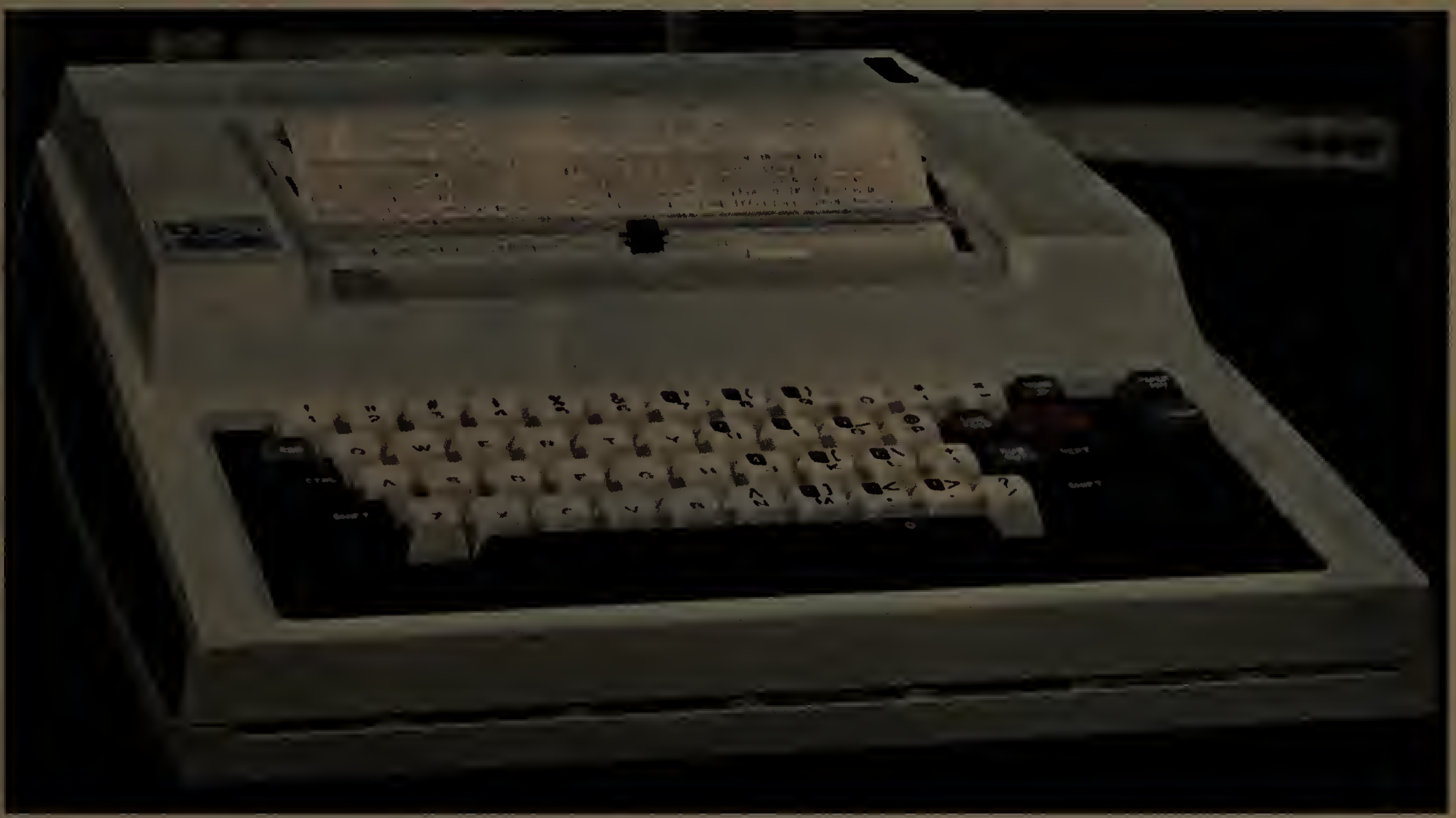
The second group contains problems which are new to a firm and which generally arise from local conditions.

The first category covers technical and engineering bugs, project control, quality control, bid evaluation and preparation and staff training. "It may be assumed that a concern which does not have adequate standards, methods and procedures to solve problems in these areas is unlikely to be seeking to expand its operations into Europe or anywhere else," the consultants added.

The second set of problems includes both precise factors, such as the state of the local economy or the provisions of local legislation, and the less-tangible influences of local customs, usages and prejudice, they continued.

"For the wary, forewarned is forearmed and prior knowledge reduces most of the difficulties to minor irritations," the booklet continued.

Copies of *The Continent of Opportunity – Europe 76/77*, are available free from Expertise International, Cleveland Road, Uxbridge UB8 2DD, Middlesex, England.



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Intel Sees Marketing Prime Problem in Add-On Area

By Toni Wiseman
Of the CW Staff

SUNNYVALE, Calif. – Marketing, not technology, is the dilemma facing add-on memory manufacturers in today's marketplace, according to Gordon Reid, product manager for Intel Memory Systems.

"Technology has rushed ahead such that innovations like charge-coupled devices (CCD) and 16K-bit devices like the 2116 are available to users, but marketing has not yet uncovered the market to use the technology in volume," Reid said.

And, he asserted, there will not be a major market for these advanced devices until there is a shift in attitude on the part of users – until they recognize the benefits they can realize despite a higher price.

Since Intel is primarily in the semiconductor and micro business, it's only natural for the company to focus on new markets where these can be used, like the non-IBM add-on market, Reid said.

"Our primary focus was originally on large IBM systems, but that meant we were only addressing 60% of the total market," he added.

Now, however, the company is focusing on providing memory to end users of non-IBM systems, such as Digital Equipment Corp., Interdata and Modular Computer Systems, Inc. and concentrating on reducing the cost to the user and increasing the performance in terms of cycle and access time and reliability, he said.

"We're able to do this because we make our own chips," Reid said.

Intel is currently addressing the DEC PDP-11/70 market in which Reid estimated there will be 2,500 users in a relatively short time – three to five years.

"The 11/70 is oriented to the time-sharing, multiple user who is going to require very large amounts of memory, which makes our product attractive on a price/performance basis," he said.

DEC provides 2M bytes of memory for the PDP-11/70, he noted, with the size limitation based on cable length. Intel has packaged four times as much density and can therefore provide the user with 4M bytes, he said.

CCDs are a reality – Intel has them, Reid said. The system provides 2M bytes in a single chassis with a controller.

CCDs, he added, are ideally suited to applications looking for very fast response time, such as time-sharing where a user needs to reduce latency and has high reliability requirements.

"I feel fixed-head disk CCD is going to be a part of memory in the future, but it has not found its place yet," Reid stated. "The industry is still struggling to identify where it fits. As a result, we haven't identified a broad enough market.

"And this means that the technology is expensive now," he stated while asserting the price, as with other memory devices, will go down as the number of products sold goes up.

CCDs' impact should begin to be felt among large users within the next two years, he predicted.

The shift will come when managers change their view of how they operate their shops, he said, and realize the cost benefits of error correction and error logging within the system.

This will mean errors are detected only during preventive maintenance time and not impact the operation of the system during use.

"We're building them today so we can offer the system right now, but the marketplace has not shifted its attitude to understanding what it costs to have an engineer go out and do error correction," he emphasized.

And, he said, it will probably take some time for the marketing people to relay these benefits to the users.

IBM Watchers Expect 380 by End of Year

LONDON – The unobtrusive arrival of the IBM 370/138 and 148 and their low purchase price indicates to many IBM watchers an end-of-series sales attitude and increases the strength of rumors that the 380 is due for a year-end announcement, according to *EDP/Europa Report* (EDP/ER).

"What is certain is that the introductions strengthen IBM's range in the middle range where [it has] been increasingly under pressure by everyone, from the super-mini makers to the major mainframe makers," EDP/ER stated.

"It is notable, now, that IBM's current architecture, still largely based on and a direct descendant from the 360, appears increasingly rigid when compared to the current offerings of ICL, Burroughs, NCR and others," the newsletter noted.

Industry observers are particularly interested by the new systems' low purchase price, only 35 times the monthly rental and less than the 370/135 or 145 prices, EDP/ER said.

Contracts

HP Signs Dataproducts

WOODLAND HILLS, Calif. – Dataproducts Corp. has received a contract from Hewlett-Packard Corp. (HP) for the supply of printers ranging from 300- to 1,800 line/min.

The contract, which is the largest between the two firms, could represent $15 million in shipments, including spares, over three years, Dataproducts said.

The printers will be used with the HP 3000 Series II as well as the 9600 minicomputer, Dataproducts said.

Other Awards

Pfizer Medical Systems, Inc. will use Ramtek Corp.'s RM-9100 Medical Imaging Display Systems in its Acta-Scanner whole-body computerized tomographic scanner.

Optimum Systems, Inc. has received a one-year contract to provide the U.S. Department of Labor's Employment Standards Administration with computer services necessary to administer the Federal Employees Compensation System.

Codex Corp. has completed delivery of an initial $215,000 contract for its LSI 9600 and 4800 modems to Televerket Norway.

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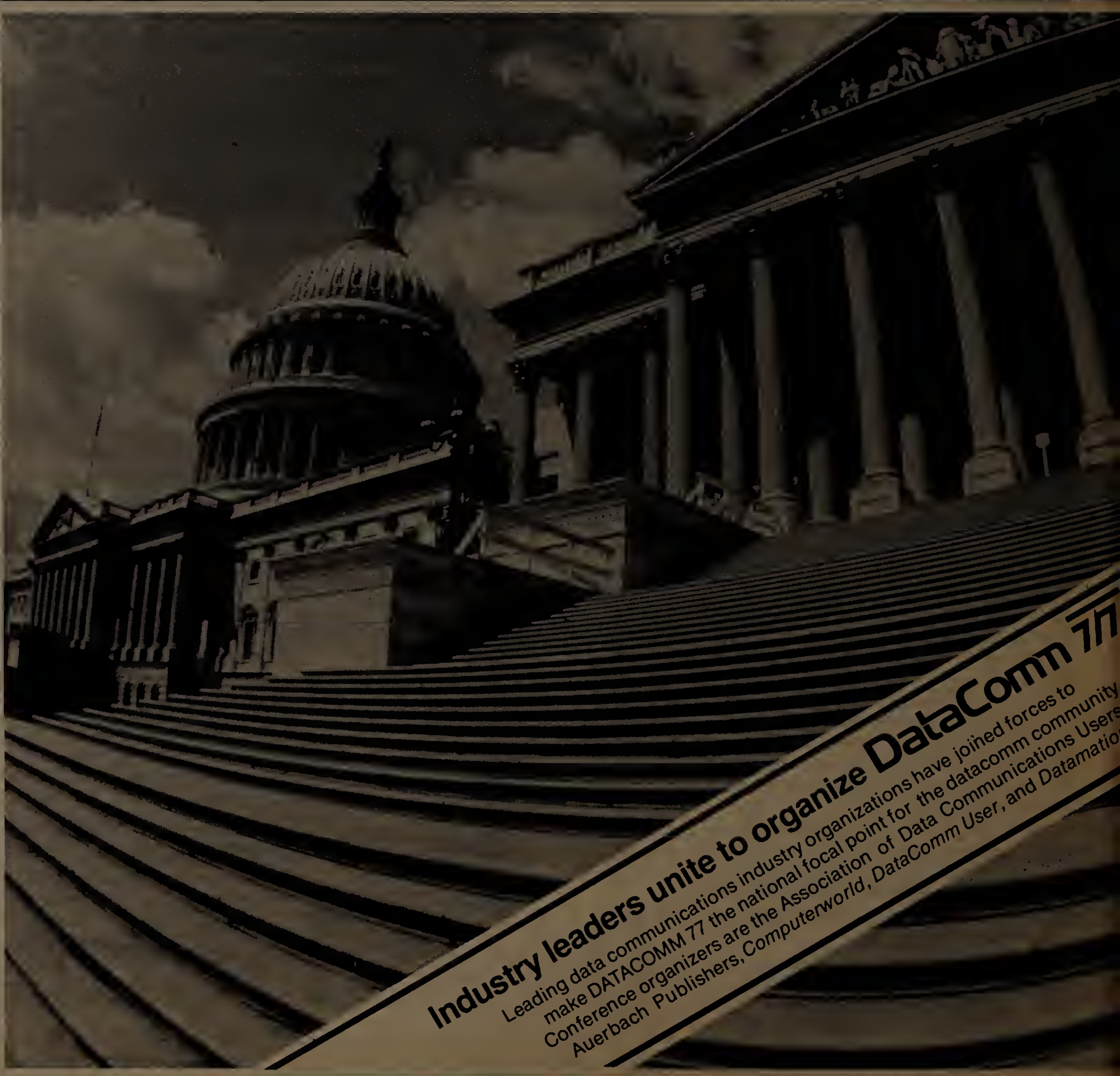
Industry leaders unite to organize DataComm 77
Leading data communications industry organizations have joined forces to make DATACOMM 77 the national focal point for the datacomm community. Conference organizers are the Association of Data Communications Users, Auerbach Publishers, Computerworld, DataComm User, and Datamatio

East African Airways Takes Off With In-House Booking System

By Ivan Berenyi

Special to Computerworld

International News

NAIROBI, Kenya – The first airline reservation system in this part of Africa has gone live with Nairobi-based East African Airways (EAA).

It is also one of the first to use IBM's CPSIM(E) package – a scaled-down version of Ipars running under DOS/VS instead of APC.

The African International Reservations System (Airs) was implemented by Eastern Airlines, which for the last three years has held a consultancy contract with EAA. Airs is based on a 256K-byte IBM 370/135, installed before the reservations development plan got under way to replace two 360/30s which had handled south/north reservations in batch mode since 1967.

"With less than 700,000 passengers a year, the decision to go to an in-house rather than a shared system was a difficult one," according to outgoing computer manager Don E. Prince, who readily admitted IBM offered ample extra time for the pains of pioneering CPSIM(E).

"If it was at all possible, the board of directors preferred to go to an in-house on-line system in order not to continually rely on outside help to support the airline," Prince said.

EAA's outgoing DP manager, Don Prince of Eastern Airlines, switches on Airs with on-line systems manager Avtar Sehmbi and lead programmer Joe Mambo.

Despite a reduction in the proposed number of staff, a government monopoly on modems and malfunctioning teletypewriter lines, Airs was up and running just 12 months from the project start – six months ahead of IBM's recommended launching date.

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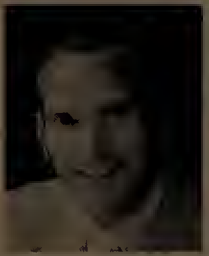
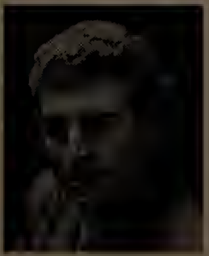


Dr. William A. Saxton



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Lessors' 360 Buys Termed 'Millstone'

IBM Trial Documents

(Continued from Page 46)

profit depends."

The planned compatibility of the NS with the 360s would be a liability to the lessors' extensive inventory of 360s, the IBM report predicted.

Industry leaders, the report observed, seemed to feel that "a) IBM will not *functionally* obsolete System/360, b) installed life will be more than twice rental/purchase multipliers and c) lease revenue for 10 years can be achieved with discounts that do not preempt profitability.

But, IBM pointed out, resulting compatibility would be detrimental to lessors because the new systems would receive faster market acceptance. The report predicted 4,500 NS CPUs would be sold and shipped by the end of 1972.

"Based on our estimates of leasing company 360 inventories in the early 1970s . . . [lessors] must extend life at least three years beyond the point that a similar leased IBM inventory will have been completely displaced by NS (current IBM Group objectives indicate 1974 as the latest date). No matter how one looks at it, 1977 is a very long time away," the evaluators remarked.

'Too Right' Prices

The 1968 report agreed with those who felt the NS strategy was essentially the leasing company's game – primarily one of price/performance. However, the 1969 report observed, the leasing company price must be "right," and it cited the overhead expenses to lessors such as placing machines, carrying those off rent, etc.

"Although it is difficult to look as far ahead as the late 1970s, it is nevertheless also difficult to foresee how early 1970 discounts of 40% to 50% can hold through the greater part of the decade.

"Thus it is conceivable that the price will have to be 'too right.' A 10-year life that produces no profit is hardly a way to run a business," the report commented, conceding the useful life of a 360 could be 10 years.

"Under this pressure of discounting, a threat will exist not only among the leasing companies, but may spill over and affect the pricing policies of the manufacturers themselves."

IBM explained its NS would be in response to introductions of fourth-generation equipment it anticipated would be made by its competitors in the early 1970s. The report indicated the competitors had technical capabilities (i.e., memory and components) comparable to IBM.

IBM's NS, in response to these moves, would be in the 360/20, 30, 40 and 50 range where leasing companies were heavily invested, the report said.

The 1969 report held out little hope for lessors' successfully implementing the alternative to discounting, which was improving 360 performance.

"We concluded once more . . . that there is no magic answer, system or approach which would allow an across-the-board upgrading of the industry's installed inventory," the report said.

After examining various methods, both hardware and software, most of which it categorized as customizing efforts, the report said, "While individual companies might gain a measure of success in this way, the price/performance of the total industry inventory will not be materially affected."

While the report declined to estimate levels of purchases of the next generation of equipment, it observed it didn't expect a very high level of buying of non-IBM fourth-generation equipment. The reasons, it said, were:

- Major computer manufacturers were continuing to expand their offerings of long-term lease discounts.
- Competitive lease-purchase multipliers would tend to move toward the IBM level as companies get safely around the profit corner.
- The then-present price disparity between plug-compatible vendors' and computer manufacturers' peripherals would narrow considerably as the DP market continued to develop.
- "With their ultimate success tied to second users, leasing companies [would] be wary of investing heavily in products [with] a limited potential, i.e., when total installed equipment represents no more than 10- to 15 million points" [about $750 million].

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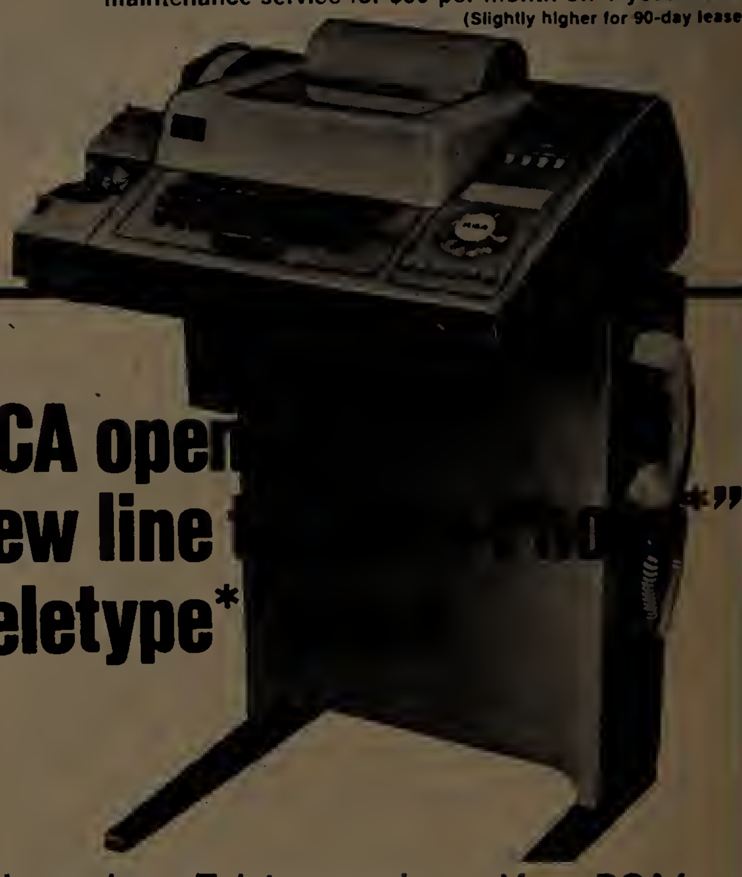

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CIRCULATION DEPARTMENT

Now Offering Controllers

Innovex Expects Sales to Rise 100% This Year

By Molly Upton
Of the CW Staff

BEDFORD, Mass. – Innovex Corp.'s 1976 sales should be twice those of last year, according to Michael Keating, vice-president of sales and marketing.

The firm has increased its distribution force and is also offering controllers along with its floppy drives, which is increasing its sales to small systems houses, Keating said.

The firm is offering microprocessor-based controllers for a variety of minicomputers, including those of Digital Equipment Corp., Data General Corp., Interdata, Inc., Keronix, Inc. and Computer Automation, Inc., he said.

Most of Innovex's sales are still on an OEM basis of drives only, he added.

The advent of the microprocessor has enabled Innovex to supply the controller, he said. With an attractive price on the controller, Keating expects an increase in the floppy drive market's growth rate.

Innovex offers its drive subsystem at a lower price and with faster delivery than some minicomputer firms, he said.

In addition to a new nationwide system of representatives, the firm has also signed up distributors in western Europe, Australia, South Africa and Japan and is looking at South America, he said.

The firm signed Sirvess, Inc. for maintenance of its drives.

Market Questioned

Innovex is offering a double-density drive, although Keating said he is not sure of the validity of the market. The firm chose to offer the product to demonstrate its technical capabilities and emphasize its position in the marketplace, Keating said.

Because IBM has elected to stay away from the double-density concept on floppies, the market has been slow in developing.

Innovex plans to offer a double-sided drive that is compatible with IBM's latest floppy announcement, he said.

When IBM came out with the Model 3740 and used the term "diskette," Innovex sued IBM for infringement of its trademark. IBM settled out of court, Keating said.

The firm initially made hard sectored diskettes and drives and still serves as a source for those diskettes, he said, although it no longer makes the drives.

Innovex buys its media and then fabricates the diskettes, he added.

OEMs Surveyed

WALTHAM, Mass. – Seventeen percent of systems houses have less than 10 employees while 29% have more than 200, according to an analysis of over 1,000 systems houses and OEMs made by International Data Corp. (IDC).

IDC used its *OEM/Systems House Prospect Data File* for its analysis, which found about 35% of the firms have been in business for six years or more, 28% have been in business for three to five years and 13% have less than two years' experience.

Analysis of hardware expenditure data showed 43% of the OEM/systems house firms spend over $500,000 for mini- and microcomputers and mini peripherals, while 21% spend less than $100,000, according to IDC.

An analysis of the firms' peripheral equipment usage showed 32% of those surveyed use disk pack drives.

Orders & Installations

Southern Bankcard Corp. in Fort Lauderdale, Fla., has installed an NCR Criterion 8550 system for on-line bank customer account updating.

Ford Motor Co.'s Tractor Operations is installing a Burroughs Corp. B7700 system and nine B772 processors for inventory applications in its parts supply system.

Seattle First National Bank has ordered an expanded Incoterm Corp. 7000 on-line banking system for use at 1,100 teller locations.

The Johns Hopkins University Applied Physics Laboratory has ordered eight SEL 32/55 minicomputers from Systems Engineering Laboratories for use in a Navy weapons system program.

Southwestern States Bankcard Association has ordered 200 Model 350 flexible disk terminals and magnetic tape drives from Sycor, Inc. for use in its regional network.

Florida Power and Light Co. of Miami has ordered a Control Data Corp. energy control system consisting of two Cyber 173 systems, four System 17 controllers and associated peripherals.

The Ralph K. Davies Medical Center in San Francisco has installed an EMI Scanner CT 5005, a whole-body computerized tomography system.

Credit Systems, Inc. has installed an automatic call distribution system from Collins Commercial Telecommunications, a division of Rockwell International Corp.

Montgomery Ward has ordered a Telecommunications Accounting and Control System from TDX Systems, Inc. for installation at its Chicago corporate headquarters. The system will manage Wats and other long-distance phone lines.

The National Aeronautics and Space Administration's George C. Marshall Space Flight Center has installed an FR 80 computer output microfilm recorder from Information International, Inc.

W.A. Storing Co. of Columbus, Ohio, has installed a Mohawk Data Sciences Corp. System 2400 key-to-disk unit for its computerized letter writing and address matching service.

General Binding Corp. in Northbrook, Ill., is installing an IBM 370/145 this fall which will be replaced by a 370/148 in mid-1977. The configuration will include 3330-I and 3330-II equivalents from Memorex, Storage Technology Corp. 6,250 bit/in. tape equipment and Raytheon on-line 3270-type CRTs and controllers.

COMPUTER MANAGEMENT
United Kingdom

World rank as DP market: *Fourth*
1975 DP expenditures (1): *$2.7 Billion*
1975 imports from US (2): *$270 Million*
Rank as importer from US: *Third*

Computer Management is a monthly magazine recently purchased by Computerworld, Inc. Monthly circulation is 30,000.

COMPUTERWOCHE
Germany

World rank as DP market: *Third*
1975 DP expenditures: *$3.7 Billion*
1975 imports from US: *$274 Million*
Rank as importer from US: *Second*

Computerwoche is a weekly tabloid newspaper started by Computerworld, Inc. It has a circulation of 21,000 to the West German computer community.

SHUKAN COMPUTER
Japan

World rank as DP market: *Second*
1975 DP expenditures: *$4.6 Billion*
1975 imports from US: *$189 Million*
Rank as importer from US: *Fifth*

Shukan is a weekly tabloid newspaper, jointly owned by Computerworld and Dempa publications. Circulation is 35,000.

Zero-Un Informatique
France

World rank as DP market: *Fifth*
1975 DP expenditures: *$2.5 Billion*
1975 imports from US: *$223 Million*
Rank as importer from US: *Fourth*

Computerworld represents **Zero-Un Informatique** in the U S. Zero-Un has three publications, one a weekly tabloid newspaper with circulation of 22,000, the second a monthly magazine, circulating 13,000 copies, and a new bi-weekly, Minis and Micros. All circulate throughout Europe's French speaking computer market.

DATANEWS
Brazil

World rank as DP market: *12th*
1975 DP expenditures: *$250 Million*
1975 imports from US: *$60 Million*
Rank as importer from US: *(Est) 10th*

DataNews is a bi-weekly tabloid newspaper in Portuguese with an English-language summary. It is owned by Computerworld, Inc. and has a circulation of 7,000.

Notes:
(1) These figures are estimates of International Data Corporation, the world's largest EDP Market research firm.
(2) Import figures come from the US Department of Commerce, and include only computers and computer-related products manufactured in the United States by US firms. Many US firms also manufacture abroad, and those products are not counted.

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Documation Entering End-User Mart To Avoid Whims of OEM World

By Molly Upton
Of the CW Staff

MELBOURNE, Fla. – Documation, Inc. is entering the end-user market with its printer and card-handling products in order to buffer itself against the vagaries of the OEM-only world.

A big benefit of entering the end-user market, according to President Ray Halbert, is the ability to "control our own destiny."

As a straight OEM supplier, a firm has no control over its order bookings, but must depend on the OEMs' sales forces to generate demand for its equipment, he said.

Halbert hopes end-user revenues will equal those from OEM sales within 18 months, for a 50-50 ratio.

"Now I can live," he commented. "A 50% cut on 50% of the OEM volume will still leave me with 75% of my business.

"But a 50% cut last year left me with 50% of my business," he said.

'The Right Move'

"We think we've made the right move. You really aren't a truly successful company, in my estimation, until you satisfy the end customer. Then you've made it in this industry," Halbert said.

"It's easy to satisfy an engineering manager who's evaluating your product to put on his system because he's not the ultimate end user. He's the guy who reads the specs and makes sure the price and performance are there.

"You've really made it when the person in the office says, 'I like this thing. It works and I can work it,' " he said.

"Now you're a success; not everyone can do that. You've got to make all the people happy that use the equipment and that means another degree of sophistication," he added.

The firm has established sales and service offices in Boston, New York, Chicago, San Francisco, Los Angeles and Washington, D.C., Halbert said.

Documation supplies a 2,250 line/min impact printer as well as card punches and readers.

In addition, it supplies a complete printer and card I/O subsystem which, with controllers, replaces a whole unit record subsystem, he said.

Documation is the only company other than IBM to offer such a subsystem, he noted.

There isn't any competition for Documation products since most firms have given up making card gear, he said.

Decision Data Computer Corp. makes a 96-column card unit and Peripheral Dynamics, Inc. makes a card reader.

Univac, Control Data Corp. and IBM make their own units, Honeywell gets its units from its operations in France and "we supply everyone else," Halbert concluded.

Adapso Meeting Begins Oct. 25

TORONTO – "Posturing for Change" will be the theme of the Data Processing Organization's (Adapso) 45th Management Conference to be held on Oct. 25-27 at the Inn on the Park here.

The conference will include discussions on various topics of interest to the time-sharing, facility management, data center and software companies in attendance.

Session Subjects

Session topics include impact of corporate consolidation on the industry, can software companies go public, common carriers now and in the future, distributive DP and data base management.

Other subjects to be covered are managing the litigation function and systems software and its future.

Special committee reports will be made on electronic funds transfer systems, privacy and security and taxation.

International Data Corp. will present studies on the computer services industry and office systems evolution.

Registration costs are $175 for member companies and $275 for nonmember companies. Adapso is at 210 Summit Ave., Montvale, N.J. 07645.

Telefile Gives Grants To Calif. University

IRVINE, Calif. – Telefile Computer Products, Inc. has awarded five grants totaling $2,500 to the Electrical Engineering Department of California State University at Long Beach.

The grants were presented to the school to encourage research in the fields of biomedical engineering, electrical power systems, solid-state electronics, hybrid circuitry and optical communications studies, according to Joe Letbetter, vice-president of operations.

CLA Honors Strong

WASHINGTON, D.C. – Robert W. Strong, manager of management information systems for Brockway Glass Co. in Brockway, Pa., has been named Executive of the Year by the Computer Lessors Association (CLA).

POSITION ANNOUNCEMENTS

position announcements

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Career opportunities available in an Atlanta Commercial Bank's expanding Systems and Programming Department. Self-motivated professionals needed in the exciting world of on-line transaction processing systems and banking applications in a multi-programming environment.

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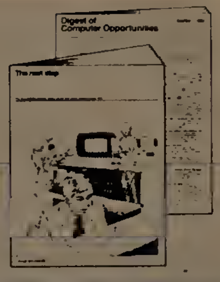
1976 Computer Salary Survey.



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The Weiland Computer Group, a Bank Data Services and Software Development Company, has immediate openings for self-motivated, career-oriented people. All positions offer excellent salary, complete benefit package, advancement potential and challenge!

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Recent growth has created a position for a Systems Programmer to assist in the development of on-line banking systems. Successful candidate will have a minimum of 3 years experience in an IBM-DOS-CICS or BTAM environment and be competent in BAL. Banking experience and/or knowledge of various terminal disciplines is helpful but is not required.

• PROGRAMMER ANALYSTS

Several openings exist for Programmer Analysts to assist in the maintenance and development of batch and on-line banking application systems. Applicants will have 1 year experience in IBM-DOS-BAL and background in banking or teleprocessing.

Successful applicants will enjoy workingwith people, possess good communication skills and be able to relate with all levels of management. Positions are available in the Northern or Southern suburbs of Chicago. Each opening provides a unique career opportunity with a young, fast-growing, people-oriented Corporation. Send resume in confidence or call collect: Geoffrey Anderson (312) 841-1900.

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Programmer

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The individuals selected must be able to maintain a stable version of SCOPE 3.4.3 at current PSR levels. Additional duties will include installation and evaluation of local modifications.

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Applicants should have 3 or more years experience with OS/Assembler knowhow and a background in on-line systems. OS/BTAM or CICS experience is desired. This is an excellent opportunity for individuals interested in a technically challenging and professionally oriented environment.

We offer highly competitive starting salaries and good Company benefits. Send resume and salary history in complete confidence to:

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1-3 years systems & programming experience using COBOL under OS. Life insurance experience preferred, but not necessary.

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2-3 years experience in real-time multitasking applications software development on NOVA-3 or ECLIPSE mini-computers under MRDOS. Person must be thoroughly familiar with the internals of MRDOS and be capable of making modifications to suit applications. Must also have extensive experience in FORTRAN and in assembly language programming at the interrupt level. We also have positions available for persons without strong MRDOS background, but have worked in the areas of signal processing, videographic image display, and interactive systems in the above environment.

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(See "Businessweek"- Sept. 13, 1976, Page 96)

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The selected applicant will analyze, evaluate, and be responsible for recommending expansion plans for our rapidly growing data communications network. Recommendations will include network configurations, selections of modems, terminals, communications control units, line adaptors, and multiplexing equipment. Experienced in leased line and dial connections with asynchronous and synchronous protocols is essential.

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Qualifications include a Bachelors Degree with a minimum of 5 years experience in systems design and implementation including 2 years IBM 360-370 OS experience.

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PROGRAMMERS

WNY client has several openings in 2 areas. SOFTWARE — analyst &/or technician. Must have expertise in IBM OS/VS Internals, mini comp, exposure a plus. APPLICATIONS-COBOL req. Familiarity w/acctg & mfg appls a must. Order entry thru MRP. $14,000-$19,000 (fee paid). Contact P. Seigal.

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programmers

Career opportunities presently exist in our EDP installation with twin 370-145's operating under OS/VSI and VM/370 with CMS.

The successful applicant will have 1-1-1/2 years programming experience on an IBM 360/370 under OS, including 6 months of MARK IV experience. A working knowledge of ANS-COBOL, would be helpful. Experience could include batch, real-time or remote teleprocessing related to commercial data processing applications.

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Oakland County is seeking a select individual for a key technical position in systems programming.

Ideally, the person should have strong backgrounds in DOS/VS, CICS/VS, DL/I, VM/370 and a DOS/VS to OS/VSI conversion.

Oakland County is the midst of rapidly expanding its teleprocessing system which serves County government and many units of local government, including a 23 agency law enforcement information network, and will being a conversion from DOS/VS to OS/VSI this fall.

The salary range of $13,150 - $18,040, with promotional opportunities to $19,671, is supplemented by an outstanding fringe benefit package which includes fully paid Blue Cross - Blue Shield, a Dental plan, a life insurance package valued at 150% of one's salary, and the traditionally excellent government holiday, vacation, sick leave and retirement plans.

Applications for this position will be accepted until further notice. For further information on qualifications or to make application, please contact:

The Personnel Department

Oakland County

1200 N. Telegraph
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The ideal candidate will show an interest in performance measurement in order to design and develop a software performance monitor. In-depth knowledge of OS/VS2 internals and familiarity with OS/MVS highly desirable.

For immediate consideration, contact John E. Hiles at the Jack Tar Hotel, San Francisco, October 12-15 or send your resume to Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086 or call (408) 735-4113. We are an equal opportunity employer m/f.

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The successful candidate will have strong commercial loan systems background experience in accounting, cash management and customer profitability systems. Several years management background preferred. This is an officer level position which provides a fast career path for the right applicant.

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M.S. in Computer Science or Engineering and three years experience in design of software systems for real-time and interactive systems.

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B.S. in Computer Science, Math, Physics, or Engineering and programming experience with higher order languages such as Fortran, Pascal or PL/I. Both scientific and real-time programmers are required.

Openings for these positions are in Dallas, Texas **U.S. Citizenship Required.**

Send your resume in confidence to:

John Floyd/P.O. Box 6015, M.S. 222/Dallas, Texas 75222.

If you're attending the Software Engineering Convention in San Francisco, call George Martin at (415) 776-8200 to arrange an interview on October 13, 14, 15 or 16.

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position announcements

DIRECTOR DATA PROCESSING

Yuba Community College District seeks a qualified individual to plan, organize and supervise the administrative data processing activities of the District. Applicants should have a Bachelor's Degree in Business Administration, Computer Science or related fields, four years of progressively responsible experience in data processing activities, two years which involved supervisory or administrative functions. Appointment will be a 12 month position, salary at $23,750, benefits including four (4) weeks vacation and medical, dental and vision benefits.

Applicant will direct the planning, development, analysis and operation of data processing systems and applications. Initial tasks are to confirm the District's tentative commitment to set up its own data processing center withits own equipment; programs and services to be purchased from other community college districts. Applicant will then guide the District through the implementation phases of hardware procurement, general systems design, detail design and systems operations.

Yuba Community College District is a multi-county district with a total population of 150,000 located in Northern California. The District consists of one campus, Yuba College, at Marysville with instructional centers at Yolo and Lake Counties. Day and evening enrollment is 10,000 students.
Send resume, salary history and the names of three references to Robert J. Carey, Asst. Superintendent-Business Services, Yuba Community College District, 2088 N. Beale Rd., Marysville, CA 95901 before October 15, 1976.

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And

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TG&Y

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MANAGER NETWORK SERVICES

Mid-Illinois Computer Cooperative

The Mid-Illinois Computer Cooperative (MICC), a computer network providing timesharing and remote batch academic computing services to six state universities, seeks applications for the position of Manager of Network Services. MICC operates a Control Data Cyber 72 computer systems using a KRONOS operating system.

The position of Manager of Network Services is responsible for the coordination of services to member institutions. Duties include direct interface with User Coordinators, planning and presentation of workshops, review of application software and supervision of documentation processes.

Minimum requirements include programming and supervisory experience in an academic computing environment with knowledge of computer based instructional materials. Individuals must be able to interface well with academic users from all disciplines. Experience with interactive CDC computing systems is desirable. Salary range is $16,000 to $20,000 annually. Deadline for receipt of applications is November 1, 1976. Resumes detailing experience should be sent to:

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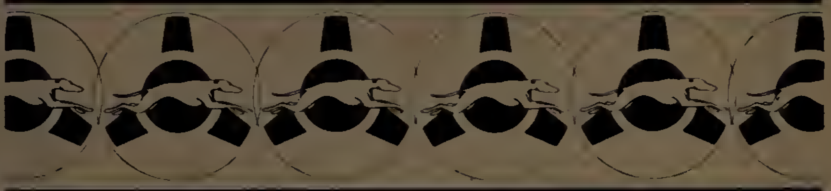

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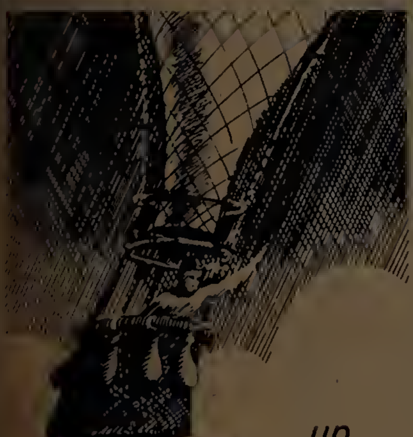

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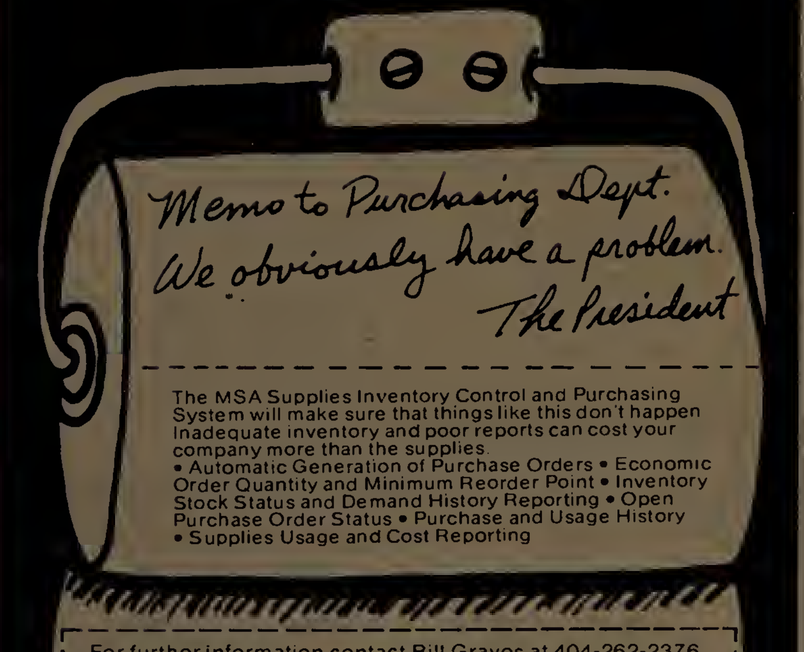
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SEL Year Recuperative

FORT LAUDERDALE, Fla. – Recuperating from a loss in fiscal 1975, Systems Engineering Laboratories, Inc. (SEL) finished out fiscal 1976 with a profit.

SEL also showed a profit for the last quarter compared with the year-ago period.

Fourth-quarter earnings totaled $403,285 or 15 cents a share compared with a loss of $32,732 in the year-ago period.

Revenues for the period were $6.3 million compared with $4.2 million in the fourth quarter of 1975.

Year earnings totaled $59,389 or 2 cents a share, including a $197,860 tax credit, compared with a 1975 loss of $321,889, including a $135,871 tax credit.

Revenues for the year were $20 million compared with nearly $17.5 million last year.

Keydata Doubles Earnings in Year With Small Increase in Revenues

WELLESLEY, Mass. – Keydata Corp.'s year-end earnings more than doubled last year's despite little change in revenues.

Earnings for 1976 climbed to $1.1 million or 40 cents a share, including a $515,000 tax credit, compared with $452,000 or 17 cents a share, including a $200,000 tax credit, last year.

Revenues for the year were $14.9 million compared with $13.5 million in 1975.

"While our fiscal 1976 financial performance is gratifying and enhances our confidence in the future, fiscal 1977 will, nonetheless, be a challenging year for the company," President L. Edwin Donegan Jr. stated.

"Sales during the last six months of fiscal 1975 and the first half of fiscal 1976 were below plan, but in the second half of fiscal 1976 they recovered sharply.

"However, the recent rebound in bookings will not make a significant contribution to revenue until the second half of fiscal 1977," he noted.

"Thus, a modest revenue decline is anticipated during the first six months of fiscal 1977 compared with the first half of the preceding year," Donegan said.

Rise 180% in Quarter

Prime Earnings Up 286% in Half-Year

FRAMINGHAM, Mass. – Prime Computer, Inc. continued on target toward its goal of $18 million in sales for the year as its second-quarter and six-month results showed sizable improvements over the year-ago figures.

Earnings rose 180% and 286% for the quarter and six months respectively.

The maker of minicomputers showed earnings for the quarter of $442,000 or 20 cents a share, including a tax credit of $198,000, compared with the year-ago $157,000 or 8 cents a share, which included a $74,000 tax credit.

Revenues for the three months totaled $4.8 million, up 79% over the $2.7 million reported in the same period last year.

During the six months, earnings rose to $807,000 or 36 cents a share, including a $375,000 tax credit, compared with $209,000 or 10 cents a share in the same period last year, when there was a tax credit of $100,000.

During the first quarter, the firm doubled its worldwide sales force to accommodate plans for increased penetration of Fortune 1,000 companies that are multinational in scope, according to President Kenneth G. Fisher.

Nearly 50% of the company's business is international in nature, he said.

Two years ago, the average unit price of a system was $15.000 to $20,000; the majority of Prime's quotes today are in the $150,000 range, Fisher said, adding this indicates the shift in emphasis to software which reflects longer product life cycles.

The firm plans to introduce its Transact series this fall.

Comsat Posts Decreased Earnings In Six Months and Second Quarter

WASHINGTON, D.C. – Communications Satellite Corp.'s (Comsat) second-quarter and six-month earnings were below those of the year-ago periods.

A change in accounting at the direction of the Federal Communications Commission (FCC) caused a $1.1 million reduction in earnings for the second quarter.

During the quarter, the firm's earnings dipped to $10.8 million or $1.08 a share compared with $11.6 million or $1.16 a share in the year-ago period.

Revenues for the quarter rose to $39.4 million compared with $34.5 million in the same period last year.

In the six months, earnings dropped to $21.9 million or $2.19 a share compared with $24.3 million or $2.43 a share in the year-ago period.

Revenues reached $76.7 million compared with $71.1 million in the 1975 half-year.

If the accounting order had not been in effect during any part of the second quarter, Comsat said, its earnings would have been $1.19 a share. If it had been in effect the entire quarter, earnings would have been 56 cents a share.

The firm said it is continuing to collect its present rates from its common carrier customers and is putting in an escrow account the difference between these amounts and those reported as revenues on the basis of "informational" tariffs as determined by the FCC.

Tally Net Soars 700% in Half-Year And Quadruples in Second Quarter

KENT, Wash. – Tally Corp.'s six-month earnings surged upward more than 700% and second-quarter earnings soared 400% compared with the year-ago periods.

In the quarter, earnings jumped to $942,000 or 27 cents a share, including a $401,000 tax credit, compared with $205,000 or 9 cents a share with a $20,000 tax credit in the year-ago period.

Revenues for the quarter were nearly $7.2 million compared with $5.4 million for the 1975 quarter.

For the six months, earnings grew to $1.6 million or 46 cents a share, including a $779,000 tax credit, compared with $233,000 or 10 cents a share, including a $55,000 tax credit, in the 1975 half-year.

Revenues for the period rose to $13.3 million compared with $9.9 million in the year-ago period.

Tally attributed the marked improvement in results to significant growth in the industries the firm serves, continued product cost reductions and reduction of foreign currency exchange losses to $23,000 from $165,000, incurred in the first quarter.

"We remain confident the third and fourth quarters will also be good," President Leslie A. Larsen said.

"The T1000 and T4000 lines will be shipping in significant quantities with the lower margins normally associated with new product introductions.

"The short-term backlog is strong, but some decline in our long-term backlog has prompted us to make some marketing changes," he said.

Nickels & Dimes

Alpex Computer will receive $11 million in settlement of its lawsuit against Pitney–Bowes.

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National CSS declared a dividend of 5 cents a share payable Sept. 1 to holders of record Aug 16.

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Western Peripherals declared a dividend of 1 cent per share payable Aug. 2 to holders of record July 9.

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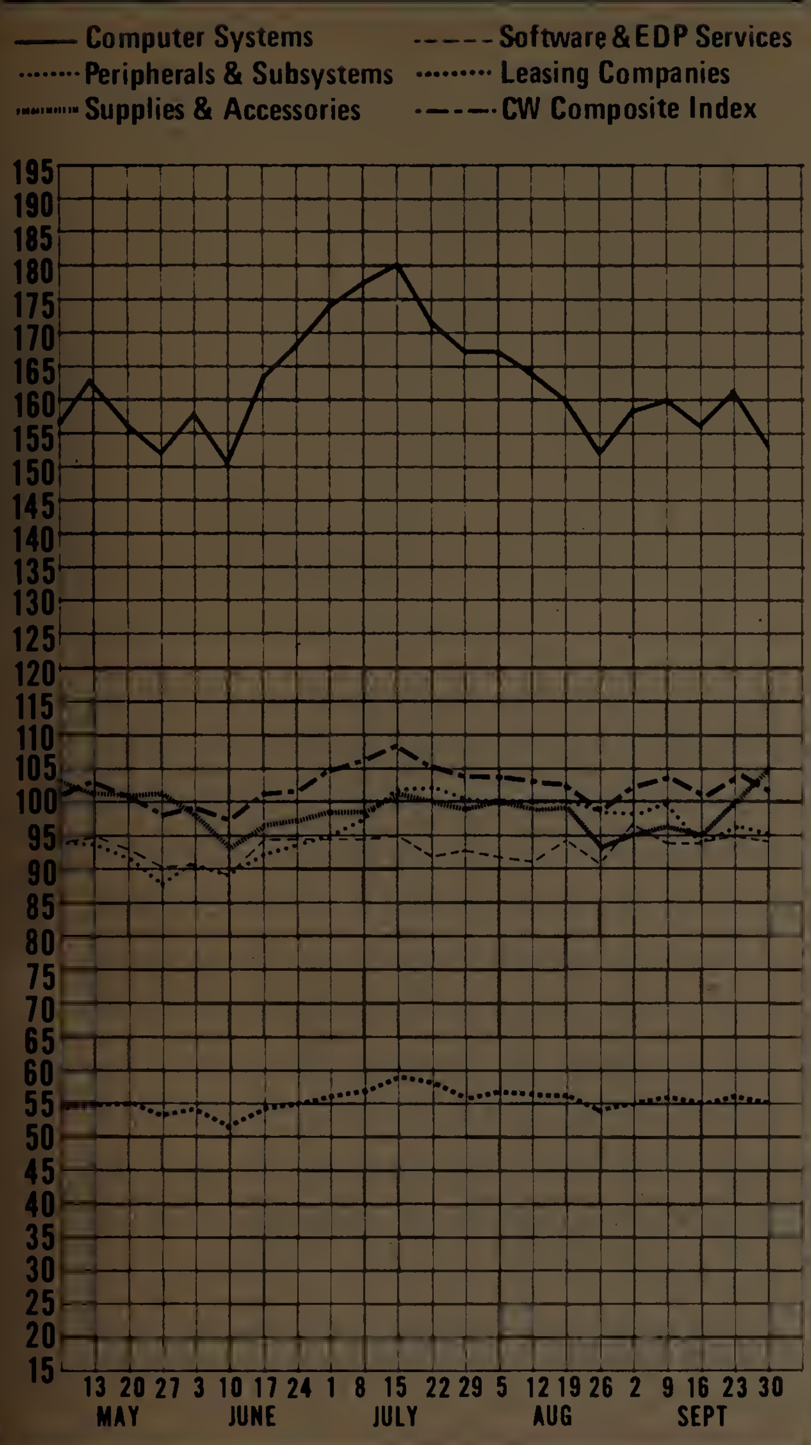

Earnings Reports

MOSTEK

Three Months Ended July 2

	1976	1975
Shr Ernd	$.21	.....
Revenue	13,493,818	$9,036,250
Earnings	901,249	(981,333)
6 Mo Shr	.35	.....
Revenue	26,067,549	23,999,145
Earnings	1,481,539	(639,829)

NATIONAL DATA

Year Ended May 31

	1976	1975
Shr Ernd	$.38	$.36
Revenue	32,946,000	31,277,000
Earnings	1,923,000	1,890,000
3 Mo Shr	.12	.08
Revenue	8,245,000	8,086,000
Earnings	579,000	394,000

NATIONAL SEMICONDUCTOR

Year Ended May 31

	1976	1975
Shr Ernd	$1.44	$1.34
Revenue	325,097,000	235,457,000
Earnings	18,953,000	16,748,000
3 Mo Shr	.34	.33
Revenue	88,166,000	57,160,000
Earnings	4,498,000	4,295,000

NUCLEAR DATA

Three Months Ended May 31

	1976	a1975
Shr Ernd	$.31	$.17
Revenue	4,385,350	3,515,823
Tax Cred	147,000	51,000
Earnings	249,463	146,445

a-Restated.

TAB PRODUCTS

Year Ended May 31

	1976	1975
Shr Ernd	$1.40	$1.63
Revenue	37,500,000	35,824,000
Earnings	1,170,000	1,358,000
3 Mo Shr	.57	.28
Revenue	10,850,000	8,631,000
Earnings	475,000	230,000

TRACOR

Three Months Ended June 30

	1976	1975
Shr Ernd	$.65	$.59
Revenue	31,727,000	26,181,000
Tax Cred	486,000	755,000
Earnings	1,698,000	1,460,000
6 Mo Shr	1.31	1.05
Revenue	59,579,000	49,176,000
Tax Cred	1,138,000	1,283,000
Earnings	3,396,000	2,583,000

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPTEMBER 29, 1976

All statistics compiled, computed and formatted by
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COMPUTER SYSTEMS

EXCH		PRICE 1976 RANGE (1)	CLOSE SEP 29 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	84-108	92 3/4	-2 3/4	-2.8
O	COMPUTER AUTOMATION	10- 19	15 5/8	-2	-11.3
N	CONTROL DATA CORP	18- 27	23 1/2	- 3/8	-1.5
N	DATA GENERAL CORP	40- 60	45 3/4	-1 1/2	-3.1
O	DATAPOINT CORP	24- 46	31 1/2	+ 1/4	+0.7
O	DIGITAL COMP CONTROL	2- 7	5 7/8	- 3/4	-11.3
N	DIGITAL EQUIPMENT	138-181	158	-4 3/4	-2.9
N	ELECTRONIC ASSOC.	2- 5	2 3/4	+ 1/8	+4.7
A	ELECTRONIC ENGINEER.	7- 16	9	- 3/4	-7.6
N	FOXBORO	28- 50	48	-1	-2.0
C	GENERAL AUTOMATION	5- 11	4 3/4	-1	-17.3
O	GRI COMPUTER CORP	1- 1	3/4	- 1/8	-14.2
N	HEWLETT-PACKARD CO	85-117	93 1/8	-1 7/8	-1.9
N	HONEYWELL INC	34- 56	45 5/8	-2 1/8	-4.4
N	IBM	227-288	281 1/2	-4	-1.4
C	MANAGEMENT ASSIST	1- 3	1 1/2	-	-3.8
O	MEMOREX	18- 33	20 7/8	-1 7/8	-8.2
O	MICRODATA CORP	10- 28	25 1/4	-1 3/4	-6.4
O	MODULAR COMPUTER SYS	4- 14	4 1/2	+ 1/4	+5.8
N	NCR	24- 37	34 1/2	-2 3/8	-6.4
O	PRIME COMPUTER INC	4- 14	11 3/4	- 1/2	-4.0
N	PERKIN-ELMER	19- 27	22 7/8	0	0.0
N	RAYTHEON CO	45- 67	63 7/8	-2 7/8	-4.3
N	SPERRY RAND	40- 52	48 1/4	-1 1/2	-3.0
O	SYCOR INC	13- 31	12 1/2	-1 1/4	-9.0
A	SYSTEMS ENG. LABS	6- 10	6 5/8	- 1/4	-3.6
N	VARIAN ASSOCIATES	13- 17	14 1/8	- 3/8	-2.5
A	WANG LABS.	11- 20	15 1/2	-1 1/8	-6.7

LEASING COMPANIES

EXCH		PRICE 1976 RANGE (1)	CLOSE SEP 29 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMDISCO INC	3- 10	7 1/2	0	0.0
A	COMMERCE GROUP CORP	2- 3	2	- 1/8	-5.8
A	COMPUTER INVSTRS GRP	1- 3	1 5/8	- 1/8	-7.1
M	DATRONIC RENTAL	1- 8	1	+ 1/8	+14.2
A	DCL INC	1- 1	5/8	0	0.0
N	DPF INC	5- 8	6 7/8	- 1/4	-3.5
N	ITEL	6- 15	12 5/8	- 5/8	-4.7
N	LEASCO CORP	6- 19	16 1/4	- 3/4	-4.4
O	LEASPAC CORP	0- 1	1/4	0	0.0
C	NRG INC	0- 1	3/8	0	0.0
A	PIONEER TEX CORP	6- 9	7 3/8	+ 1/8	+1.7
N	U.S. LEASING	7- 12	9 1/2	- 1/4	-2.5

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		PRICE 1976 RANGE (1)	CLOSE SEP 29 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 3	1 1/2	- 1/4	-14.2
C	ANACOMP INC	6- 11	7 1/8	- 1/4	-3.3
A	APPLIED DATA RES.	2- 4	3 1/4	- 3/4	-18.7
N	AUTOMATIC DATA PROC	17- 35	31 1/4	- 3/4	-2.3
O	COLEMAN AMERICAN COS	2- 6	2	- 1/2	-20.0
O	COMPUTER DIMENSIONS	3- 7	5 3/4	+ 1/2	+9.5
O	COMP ELECTION SYSTMS	5- 9	5 1/4	- 3/4	-12.5
C	COMPUTER HORIZONS	1- 2	1 1/2	+ 1/4	+20.0
O	COMPUTER NETWORK	2- 6	5	- 1/4	-4.7
N	COMPUTER SCIENCES	4- 8	6 1/8	- 1/4	-3.9
O	COMPUTER TASK GROUP	1- 1	1 1/2	+ 1/2	+50.0
O	COMPUTER USAGE	3- 6	3 1/4	+ 1/4	+8.3
O	COMSHARE	2- 9	5 1/4	0	0.0
O	DATA DIMENSIONS INC	2- 4	2 7/8	+ 1/4	+9.5
O	DATATAB	1- 1	1 3/8	0	0.0
N	ELECTRONIC DATA SYS.	12- 18	15 1/2	0	0.0
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	INSYTE CORP	1- 3	1 3/8	- 1/4	-15.3
C	IPS COMPUTER MARKET.	1- 2	1 1/8	0	0.0
O	KEANE ASSOCIATES	2- 4	2 1/4	0	0.0
O	KEYDATA CORP	2- 5	1 1/2	- 1/8	-7.6
O	LOGICON	3- 4	3 5/8	+ 1/4	+7.4
A	MANAGEMENT DATA	1- 3	2 3/8	- 3/8	-13.6
A	NATIONAL CSS INC	13- 25	20 5/8	- 1/2	-2.3
A	ON LINE SYSTEMS INC	18- 22	17 7/8	-2 1/8	-10.6
N	PLANNING RESEARCH	3- 5	3 3/4	- 1/4	-6.2
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIDATA INC	2- 5	1 3/4	- 3/8	-17.6
O	REYNOLDS & REYNOLDS	13- 21	16	+1 1/4	+8.4
O	SCIENTIFIC COMPUTERS	1- 1	1 1/8	+ 1/8	+12.5
O	TYMSHARE INC	17- 28	18	+ 3/4	+4.3
A	URS SYSTEMS	3- 5	3 7/8	0	0.0
N	WYLY CORP	2- 7	1 1/2	- 1/4	-14.2

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1976 RANGE (1)	CLOSE SEP 29 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	8- 13	10 7/8	+ 1/4	+2.3
O	ADVANCED MEMORY SYS	4- 10	6 5/8	0	0.0
N	AMPEX CORP	5- 10	6 7/8	- 5/8	-8.3
C	ANDERSON JACOBSON	2- 4	2 7/8	0	0.0
O	APPLIED DIG DATA SYS	13- 25	20 1/4	+ 1/2	+2.5
O	BEEHIVE MEDICAL ELEC	3- 9	8 7/8	- 1/8	-1.3
A	BOLT,BERANEK & NEW	7- 11	8 1/4	- 3/8	-4.3
N	BUNKER-RAMO	5- 10	7 1/4	- 1/2	-6.4
A	CALCOMP	4- 7	4 1/2	0	0.0
O	CAMBRIDGE MEMORIES	0- 6	3/8	0	0.0
N	CENTRONICS DATA COMP	20- 36	33 5/8	- 7/8	-2.5
O	CODEX CORP	22- 42	32	-3	-8.5
O	COGNITRONICS	1- 1	3/4	- 1/8	-14.2
O	COMPUTER COMMUN.	1- 6	5 3/4	- 3/4	-11.5
O	COMPUTER CONSOLES	4- 7	4 1/2	0	0.0
A	COMPUTER EQUIPMENT	1- 3	1 3/4	0	0.0
O	COMPUTER TRANSCEIVER	1- 3	1	0	0.0
O	COMTEN	4- 9	8 1/4	- 1/4	-2.9
A	CONRAC CORP	20- 25	22 1/2	- 3/8	-1.6
O	DATA ACCESS SYSTEMS	1- 4	4 3/4	0	0.0
O	DATA 100	7- 13	9	+ 1/2	+5.8
A	DATA PRODUCTS CORP	5- 15	12 3/4	+ 1/8	+0.9
O	DATA TECHNOLOGY	1- 2	1 3/8	- 1/4	-15.3
O	DATUM INC	1- 2	1 1/4	- 1/8	-9.0
O	DECISION DATA COMPUT	1- 4	1 1/2	+ 1/4	+20.0
O	DELTA DATA SYSTEMS	1- 1	3/4	0	0.0
N	ELECTRONIC M & M	1- 4	3 3/8	- 1/8	-3.5
O	FABRI-TEK	1- 1	5/8	0	0.0
O	GENERAL COMPUTER SYS	1- 2	7/8	- 1/8	-12.5
N	HAZELTINE CORP	4- 12	8 1/2	- 1/4	-2.8
N	HARRIS CORP	34- 55	52 1/2	0	0.0
A	INCOTERM CORP	9- 20	11 3/4	+ 1/8	+1.0
C	INFOREX INC	3- 7	5	0	0.0
O	INFORMATION INTL INC	10- 18	12 1/4	+ 1/8	+1.0
O	INTEL CORP	59-109	59 1/2	-3 1/2	-5.5
A	LUNDY ELECTRONICS	3- 7	3 3/4	0	0.0
O	MSI DATA CORP	3- 7	5 7/8	0	0.0
A	MILGO ELECTRONICS	15- 21	17 3/8	- 5/8	-3.4
N	MOHAWK DATA SCI	3- 10	7 3/8	- 3/8	-4.8
O	PENRIL CORP	1- 3	2	0	0.0
A	PERTEC CORP	3- 8	6 3/4	- 3/8	-5.2
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
C	PRECISION INST.	3- 10	3	0	0.0
O	QUANTOR CORP	4- 6	4 1/8	0	0.0
O	RECOGNITION EQUIP	6- 11	9 1/8	- 1/8	-1.3
N	SANDERS ASSOCIATES	6- 11	9 1/8	- 3/8	-3.9
O	SCAN DATA	2- 4	1 3/4	- 1/8	-6.6
O	STORAGE TECHNOLOGY	9- 13	10 7/8	-1	-8.4
O	T BAR INC	5- 10	5 3/4	- 1/8	-2.1
O	TALLY CORP.	4- 6	4	- 1/4	-5.8
O	TEC INC	3- 6	6 1/4	+ 1/2	+8.6
N	TEKTRONIX INC	45- 69	65	-2	-2.9
N	TELEX	2- 5	2 7/8	- 1/8	-4.1
O	WANGCO INC	11- 22	21 1/8	0	0.0
O	WILTEK INC	2- 2	2 3/4	+1	+57.1

SUPPLIES & ACCESSORIES

EXCH		PRICE 1976 RANGE (1)	CLOSE SEP 29 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED SYSTEMS INC	1- 4	3 1/4	0	0.0
O	BALTIMORE BUS FORMS	3- 5	3 5/8	+ 5/8	+20.8
A	BARRY WRIGHT	6- 10	9 3/8	+ 1/4	+2.7
O	CYBERMATICS INC	1- 1	1/2	0	0.0
A	DATA DOCUMENTS	25- 44	44	+13 1/8	+42.5
O	DUPLEX PRODUCTS INC	13- 24	14 1/2	+1	+7.4
N	ENNIS BUS. FORMS	6- 8	6 1/4	0	0.0
O	GRAHAM MAGNETICS	8- 13	9 3/4	- 3/4	-7.1
C	GRAPHIC CONTROLS	13- 19	16 1/2	- 1/4	-1.4
N	3M COMPANY	53- 66	64 3/4	-1 3/8	-2.0
C	MOORE CORP LTD	35- 51	35	- 1/4	-0.7
N	NASHUA CORP	11- 18	17 1/2	- 1/4	-1.4
O	STANDARD REGISTER	15- 19	16 3/4	+ 1/2	+3.0
O	TAB PRODUCTS CO	5- 11	10	- 1/4	-2.4
N	UARCO	20- 25	20	- 1/8	-0.6
A	WABASH MAGNETICS	4- 9	8	+ 3/4	+10.3
N	WALLACE BUS FORMS	19- 25	22 1/2	+ 1/8	+0.5

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